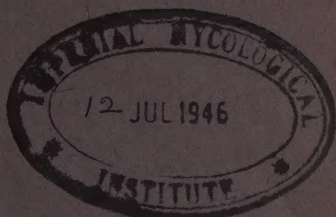


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DISEASES CAUSED BY BACTERIA AND FUNGI

ROWLANDS, W. T., & FIELD, H. I. (1943.) The examination of milk samples for mastitis.—*Vet. Rec.* 55. 495-497. 766

In an effort to devise a rapid and simple method of diagnosis for mastitis which practitioners could carry out, R. compared the results obtained by cultural methods with those obtained by direct microscopic examination.

McKenzie's thallium acetate glucose broth was used for cultivation and Newman's formula for a methylene-blue stain for smears for direct microscopic examination. A comparison was made with Van Rensburgh's method, which includes incubation at 37° C. for 18 hours prior to microscopic examination.

Van Rensburgh's technique compared unfavourably with the cultural method employed. This was, however, explained largely by the fact that the samples examined were unselected—a factor unfavourable to Van Rensburgh's method; some samples were macroscopically abnormal; they were taken at different periods of milking and often without any precautions to avoid contamination.

An important point is raised in connexion with incubation. In the absence of *Streptococcus agalactiae* or when contamination is heavy, the type of cell present is a valuable aid in assessing the exact condition prevailing in the udder. Incubation tends to destroy these cells though encouraging the growth of bacteria. From the evidence obtained, however, the authors consider that direct microscopic examination following 18 hours' incubation is a valuable adjunct to diagnosis and should be adopted by practitioners.—N. S. BARRON.

DEGARA, P. F. (1945.) Studies on the relative susceptibility of young and of full-grown rabbits to intravenous infection with hemolytic streptococci.—*J. Immunol.* 51. 23-27. 767

A single intravenous injection of 1, 2 or 4 ml. of an 18-hour broth culture of *Streptococcus pyogenes* was given to young and to full-grown rabbits. Of the full-grown rabbits, 48% survived for at least one week; of the young rabbits, 80% survived. When the comparative weights are taken into account, the resistance of the young rabbits is even more striking. Blood cultures were obtained from all rabbits dying within a week. Arthritis occurred in all the young and in 12 of 14 full-grown rabbits surviving the infection. A greater number of joints were involved in the young rabbits.

The author suggests that the relatively greater susceptibility of the full-grown rabbits was due to their sensitization by previous contact with the organisms or their products and presents some evidence to support this theory.—R. M. LOOSMORE.

I. FOMINA, A., KRUGLOV, A., MYSHKIN, P., & KALSA-ROV, A. (1940.) Opyt massovoi vaktsinatsii krol'kov

protiv mastita samok i piemii molodnyaka. [Mass vaccination of rabbits against mastitis and of the young against pyaemia (staphylococcal infection).]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 111-112. [French summary.] 768

II. KIUR-MURATOV, A. P., FOMINA, A. Y., & KRUGLOV, A. (1940.) Infektsionnyi mastit matok i piemiya u krol'chat. [Infectious mastitis of rabbits and pyaemia of the young.]—*Ibid.* 112-113. [French summary.] 769

I. Results are presented of a field-scale vaccination experiment covering seven establishments and using 3,675 adults and 1,780 young rabbits. An eighth establishment was used as a control. *Staphylococcus* vaccines were administered in two doses, the first before mating and the second during the first half of the gestation period. [Details of the preparation of the vaccines are not mentioned and the dose is not given.] The incidence of mastitis was markedly reduced in all cases (the maximum reduction was from 16% to 1%, and the minimum from 10% to 5.4%). The incidence of pyaemia in the young animals fell from 89% to 0% in the most favourable result and from 10% to 3.6% in the least favourable. In the control establishment, where vaccination was not practised, the incidence of the disease showed a slight increase over the period of the experiment. The authors consider that vaccination should be applied in all establishments where there is potential infection of the type described.

II. This is a brief summary of the results obtained in an investigation of pyaemia of sucking rabbits and its relation to mastitis of the mothers. In all, 1,700 does and 1,500 young rabbits were kept under observation and the causal organism was found to be *Staphylococcus pyogenes*. Carriers play an important role in the maintenance of the infection. It was found that vaccination of the pregnant does 14 days or more before parturition, produced a marked reduction in the incidence of mastitis in the does and of pyaemia in the progeny. [The vaccines are described as heterologous anti-staphylococcal vaccines, but no details are given regarding their preparation.] The results of vaccination experiments involving 1,500 does and 165 young are tabulated.—J. ALLAN CAMPBELL.

KRANEVELD, F. C., & MANSJOER, M. (1941.) Het verspreiden van miltvuurkiemen door aasetende dieren. [The spread of anthrax by carrion eaters.]—*Ned.-ind. Bl. Diergeneesk.* 53. 313-340. [English summary.] 770

Observations are made as to the possibility of carrion-eaters in the Dutch East Indies being responsible for the spread of anthrax after eating infected carcasses. The more common carrion-eaters observed were the tiger, cats and wild cats, the black bear, pigs, rats and

in some cases also mice. Certain birds also eat flesh and carry pieces of meat over long distances. Among the birds reported are the fowl, the crow, the raven, the kite (*Haliastur indus intermedius*), the sea eagle, the sparrow hawk (*Elanus caeruleus hypoleucus*) as well as the falcon (*Falco cenchroides*), the black and white heron (*Accipiter fasciatus wallacei*) and the marabou stork (*Leptoptilus javanicus*). Crocodiles and the common monitor lizard (*Varanus salvator*) were also held responsible for carrying anthrax organisms after ingestion of infected carcasses.

Laboratory tests as well as common observation confirmed that many of these animals became infected with anthrax, although in most cases death did not result.

The experiment described deals with the following carrion-eaters: pigs, dogs, cats, leopard cats (*Prionailurus bengalensis javanensis*), palm civets, rats (*Paradoxurus hermaphroditus javanensis*), fowls, crows, brahminy kites (*Haliastur indus intermedius*) and monitor lizards. The animals concerned were kept in observation for a month after the absence of anthrax bacilli from their faeces had been established for 14 days. They were then given a meal from a carcass of a goat or a horse which had died of anthrax. Half the animals were given the infected meat immediately after death and were thus receiving a feed of germinative bacteria. The others received meat from an animal which had died 48 hours previously, the muscles of which had been torn open, so that the experimental animals received a feed mainly of spores. Faeces were collected from the experimental animals immediately after being passed and were examined for anthrax bacilli by cultural or biological methods. All cages were disinfected daily. After four weeks, all the animals were killed and cultures made from all tissues.

The results are given in tables and can be summarized as follows. Among the animals tested, the maximum number of days during which anthrax bacilli were found in the faeces following ingestion of infected material were: dogs, 17 days; cats and wild cats, 19 days; palm civets, 7-9 days; pigs, 19 days; rats, 28 days; fowls, 18 days; crows, 9 days; brahminy kites, 12 days; water monitor lizards, 27 days. Deaths due to anthrax septicaemia occurred among dogs, cats, palm civets, crows and rats, the latter being considered most dangerous in the spread of infection. Results did not vary considerably between the group which received fresh material and that which was fed on flesh containing spores. It was further shown that in monitor lizards the anthrax bacilli could be found in the liver, spleen and blood stream at the site of infection for more than four weeks after a subcutaneous inoculation of the organism. None of the monitor lizards died of anthrax. A useful review of the literature is also given.—B. WEITZ.

*DIEHL, K. (1942.) Tierexperimentelle Erbforschung bei der Tuberkulose. [Experiments on the inheritance of TB.]—*Beitr. Klin. Tuberk.* 97. 331-349. [Abst. from abst. in *Bull. Inst. Pasteur* 41. 279.] 771

From 70 lines of rabbits 14 were selected, some of which had shown marked susceptibility and some of which had shown marked resistance to infection with bovine type tubercle bacilli.

Rabbits belonging to the selected lines were each inoculated with 0.01 mg. of a virulent strain of bovine type tubercle bacilli. Marked differences were found in the survival time of the different lines. Two lines showed particularly marked differences; in one, gross lesions were confined almost entirely to the thoracic cavity, while in the other, localization was in the skeletal glands, joints, etc., the only lesions in the thoracic cavity being small reddened spots in the lungs. These differ-

ences were transmitted hereditarily. D. concludes that inherited predisposition is a factor in the development of tuberculosis.—H. I. FIELD.

*ROWOLD, B. (1942.) Die Pathogenität humaner und boviner Tuberkelbakterien für die Katze. [Pathogenicity for cats of human and bovine types of *Mycobacterium tuberculosis*.]—*Inaug. Diss., Hanover*. [Abst. from abst. in *Bull. Inst. Pasteur* 42. 68.] 772

Twelve cats were infected with tubercle bacilli, six with human strains and six with bovine, each receiving three injections subcutaneously, followed by three meals of milk containing tubercle bacilli. Ten died in 3-4 months from generalized TB. The two surviving cats were given a further injection intrathoracically, one dying after three weeks and the other being killed after four weeks. In most cases lesions were not obvious and diagnosis had to be confirmed by culture and g. pig inoculation. Neither clinically nor by macroscopic and microscopic examination of the lesions was R. able to distinguish between human and bovine type infections. Caseated lesions were found in only three cases. Transmission of TB. by two mothers to their kittens did not occur. The complement-fixation method was not successful in aiding early diagnosis although 11 of the 12 cats were positive to the tuberculin test. Passage of the organisms through the cats appeared to attenuate their virulence for g. pigs. Cats often seem fairly resistant to inoculation with both human and bovine type tubercle bacilli.—H. I. FIELD.

CORPER, H. J. (1943.) Bacillary and tuberculin allergy and their relation to specific tuberculosis immunity. —*Yale J. Biol. Med.* 15. 373-391. 773

The injection of tuberculous g. pigs with tuberculin gave very varied results, being beneficial, detrimental or without appreciable effect. Factors influencing the result included the anatomical distribution of the tuberculous lesions and the allergic state of the animal. Tuberculin therapy in man is not warranted by any evidence available from animal experiments. The injection of tuberculin in g. pigs which were immune, having been vaccinated with viable avirulent tubercle bacilli, or which were tuberculo-allergic, i.e., had been vaccinated with heat-killed bacilli in mineral oil, had no effect on the TB. which followed intracutaneous injection of virulent human tubercle bacilli. Thus although such animals fail to react to tuberculin and are protected against the lethal general effects of this product, they are still susceptible to viable virulent organisms. It is possible, therefore, to distinguish two types of tuberculo-allergic hypersensitivity, tuberculin allergy or that produced by tuberculin, which seems to be of no practical importance in natural TB., and tuberculo-bacillary allergy or that elicited by viable tubercle bacilli and which is of practical importance in natural tuberculosis. It has not yet been possible to separate tuberculo-bacillary hypersensitivity and specific tuberculo-immunity, but the problem can now be approached more intelligently.—E. G. WHITE.

CORPER, H. J., & COHN, M. L. (1944.) An attempt to desensitize against tuberculo-bacillary allergy.—*Amer. J. clin. Path.* 14. 344-349. 774

In view of the findings of CORPER [see preceding abst.] an attempt was made to desensitize tuberculo-bacillary allergic g. pigs (status produced by the subcutaneous injection of 0.1 mg. of viable avirulent human organisms) by means of repeated intravenous injections of the sensitizing organisms. An accentuation and not a reduction of allergic hypersensitivity was obtained with both intracutaneously injected tuberculin and intracutaneously injected viable bacillary bodies. The treatment of similarly sensitized g. pigs by means of

repeated subcutaneous injections of heat-killed bacilli in oil resulted in a slight accentuation of allergic hypersensitiveness. Attempted desensitization by repeated heat-killed organisms administered subcutaneously had no effect on the allergic sensitivity but this was depressed by repeated intravenous injection. This effect did not appear to be a true desensitization and was regarded rather as resulting from an upset of the general vascular system due to the deposition of bacilli in splenic and other haemo-lymph depots.—J. LOCHIEL MCGIR.

*MANZINI, C. (1942.) Ueber eigenartige gelbe karotinoide Herde bei der Lungentuberkulose. [Yellow carotenoid foci in pulmonary tuberculosis.]—*Z. Tuberk.* 89. 21-37. [Abst. from abst. in *Bull. Inst. Pasteur.* 42. 71.] 775

In some caseated lungs, yellow foci are found which are due to the deposition of carotene in the cells of the alveolar spaces. This pseudo-icteric appearance is due not only to dysfunction of the liver but equally to upset of local tissue metabolism. Two types of carotenized foci are found, one localized around lesional foci or caseous areas and the other in the form of deposits in the alveolar spaces.—H. I. FIELD.

COHRS, P., & STREICH, W. (1943.) Verknöcherung der rechten Herzkammer beim Pferde, die Folge einer tuberkulösen hyperergischen Myositis. [Ossification of the right auricle of a horse as a result of a hyperergic tuberculous myositis.]—*Dtsch. tierärztl. Wschr.* 51. 92-95. 776

Ossification of the wall of the right auricle was found at autopsy in five tuberculous horses. In four of these horses tuberculous lesions were present in the affected auricular wall. The accepted view of this auricular lesion was that it arose primarily from circulatory disturbances leading to dilatation of the right auricle, with subsequent damage to the muscle fibres and proliferation of the intermuscular connective tissue, followed by ossification. From a study of the various stages of the process present in their cases, the authors concluded that the lesion was an "allergic-hyperergic" myositis due to localization of the tuberculous process in the wall of the right auricle in a sensitized animal. Near the tuberculous granulation tissue, there were a fibrinous oedema of the interstitial tissue and small focal accumulations of cells resembling Aschoff bodies. The local muscle fibres degenerated and disappeared and organization followed. The local arteries often showed similar inflammatory changes, the intimal thickening leading to obliteration of their lumen. Metaplastic ossification followed.

From the literature, it appears that at least more than half of the horses in which this auricular lesion was found were tuberculous. The condition is not generally associated with circulatory disturbances and is usually recognized only P.M., but it may in some cases lead to sudden illness and death.—E. COTCHIN.

DOYLE, T. M. (1945.) Vaccination against Johne's disease.—*Vet. Rec.* 57. 385-387. 777

D. conducted experiments designed to test the safety of a vaccine consisting of living *Mycobacterium johnei* suspended in liquid paraffin. Five calves were inoculated at the age of five months, with 30 mg. of bacilli, i.e., six times the usual prophylactic dose. Although this large dose produced unsightly fibro-caseous swellings in the neck, in no case did the infection pass to even the nearest lymph node. No evidence was found of the presence of infection in the mesenteric lymph nodes or the intestines when four of the animals were killed 32 months after inoculation. All four cattle were in prime condition at the time of slaughter.

Eight goats were inoculated with the same dose of

vaccine (30 mg.) without adverse effect on their general health or condition, although fibro-caseous lesions formed at the site of inoculation, as in the cattle. The infection, with one exception, extended as far as the prescapular lymph node, but never farther. Typical acid-fast bacilli were found in the local lesions in animals killed 14 and 15 months after inoculation, but none were found 31 months after inoculation. No acid-fast organisms were found in the intestines or mesenteric lymph nodes. The vaccine sensitizes the animals to both mammalian and avian synthetic medium tuberculin.

D. believes that the vaccine deserves a trial in heavily infected herds in this country and until more information on the duration of immunity is obtained, he recommends that animals should be revaccinated at intervals of 15 months, or even less if the inoculation lesion has been absorbed.—I. W. BROCKLEHURST.

MCGILVRAY, C. D. (1944.) The transmission of glands from horse to man.—*J. Amer. vet. med. Ass.* 114. 255-261. [Also appeared in *Canad. J. publ. Hlth.* 35. 268-275.] 778

Glands in the horse is described with regard to its distribution, aetiology, diagnosis and control in Canada. No new material is presented. An interesting survey of the disease in man is given and two cases seen personally by the author are described clinically.

—R. R. A. COOMBS.

LÜTJE, (1944.) Rotlaufverdacht und Rotlaufbestimmung bei notgeschlachteten Schweinen. [Suspicion and confirmation of erysipelas in swine slaughtered compulsorily.]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 50-51. 779

Of 1,235 swine compulsorily slaughtered for suspected swine erysipelas, the organisms could not be determined in 498; three of the remainder had mixed infections with *Erysipelothrix rhusiopathiae* and *Salmonella cholerae-suis*. In 634 cases, infection was septicaemic; skin "diamonds" were present in 25 and in 98 there were heart valve lesions. Thirty-seven skin lesion cases and 63 heart valve lesion cases were not associated with septicaemia. Bacteriological examination of the carcass is the only way to determine whether there is a generalized distribution of the organism in cases showing apparently localized lesions on the skin or heart valves and this is contrary to German meat inspection regulations.—E. COTCHIN.

FOMINA, A. Y. (1940.) Influenta krolikov. [Influenza of rabbits.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 105-110. [French summary.] 780

Bacteriological examinations of lung-tissue emulsions and respiratory secretions from a large number of healthy and diseased rabbits established the connexion of pasteurilla with rabbit influenza. The disease was successfully induced in healthy rabbits after infection with pathological material or with pure cultures of pasteurilla, but filtrates from diseased tissue were not infective. The strains of pasteurilla isolated exhibited a marked variability in cultural, biochemical and pathogenic properties. Two main groups (M and D) were recognized. D strains grew fairly readily on simple media; most of them fermented glucose, sucrose and mannitol and they were strongly pathogenic to rabbits and mice. M strains were decidedly less virulent, grew well only on enriched media, and had only a feeble action on carbohydrates.

The susceptibility of rabbits varies with age, young animals being more susceptible, and with the season of the year (in one series, 88-100% died from artificial infection in the spring and autumn, while in the summer none developed symptoms). Both M and D strains

were occasionally isolated from clinically healthy animals (carriers). The occurrence of enzootic outbreaks can be correlated with, among other factors, the proportion of carriers, the type of pasteurella, the age of animals and the time of year. Overcrowding or regrouping of animals may precipitate an outbreak. The recognition of carriers is readily accomplished by instilling the nasal mucous membranes with a 0.5% solution of brilliant green, or 1% silver nitrate, since the consequent irritation provokes a typical rhinitis in carrier animals.—J. ALLAN CAMPBELL.

KYAW, M. H. (1945.) Note on a bacterial cause of sterility in the rabbit.—*Vet. Rec.* 57. 502-503. 781

In this preliminary note K. puts forward evidence that *Pasteurella septica* was closely associated with sterility in the rabbit stock at a particular laboratory. Examination P.M. of affected rabbits revealed enlarged uteri, which were full of a cheesy, sticky pus. The condition was apparently transmitted by the male.

—N. J. SCORGIE.

BELL, J. F. (1945.) The infection of ticks (*Dermacentor variabilis*) with *Pasteurella tularensis*.—*J. infect. Dis.* 76. 83-95. 782

B. carried out a series of experiments with *D. variabilis* using a virulent strain of *Past. tularensis* for the transmission experiments and an avirulent strain for the antigen in the agglutination tests. The majority of ticks used were laboratory-reared and methods of rearing and infecting are recorded. Rabbits, horses and one dog were used as hosts, being given sufficiently large doses of organisms to ensure bacteraemia and death before the ticks, whose feeding was greatly facilitated by heightened environmental temperature, were replete.

The incidence of infection was determined by injecting emulsions of various sized groups of ticks into mice and observations were made on the susceptibility of ticks to infection, the avidity and vitality of infected ticks on a host, the infection of normal larvae fed concurrently with infected nymphs on normal and immune hosts, the survival and fecundity of infected ticks, stage by stage, and the retention of infection by ticks.

The experiments were based on analogous studies on plague with a view to determining the nature of the barriers to the spread of tularaemia among ticks. Lack of uniformity of infection of ticks was possibly caused by individual variation in susceptibility. Bacteriophage was not recorded. Fecundity of infected ticks was not apparently diminished nor was viability adversely affected. There was no evidence of "hereditary" transmission with this particular species of tick. Infected ticks feeding on immune hosts lost infection permanently and the infection was not passed on to clean ticks feeding concurrently. The importance of immune animals in limiting spread of tularaemia was thus demonstrated.—S. A. EVANS.

LARSON, C. L. (1945.) The susceptibility of the golden hamster (*Cricetus auratus*) to tularemia.—*Publ. Hlth. Rep., Wash.* 60. 839-841. 783

The susceptibility of golden hamsters and mice to tularaemia was compared by the intraperitoneal injections of serial dilutions of suspensions of liver and spleen from an infected, g. pig. The susceptibility of the hamsters approximated to that of the mice. Hamsters inoculated with a 10^{-6} dilution of a suspension of *Pasteurella tularensis* intramuscularly or intracerebrally died, but no deaths occurred in animals inoculated intranasally.—U. F. RICHARDSON.

MONOD, J. (1943.) Influence de la concentration des substrats sur la rapidité d'adaptation chez le *B. coli*.

[Influence of concentration of the substrate on the rapidity of adaptation of *Bacterium coli*.]—*Ann. Inst. Pasteur.* 69. 179-181. 784

By measuring the rates of growth of cultures of *Bact. coli* in media containing different carbohydrates at various concentrations, it was possible to demonstrate phases of adaptation of the organisms to the different sources of organic C. For example, whereas growth on glucose at 0.005% concentration was rapid and immediate, a long phase of three hours was observed before active growth commenced on a maltose medium at the same concentration, this long phase becoming shorter as the concentration of maltose increased. This time-lag was considered to be a period of adaptation, during which the bacteria were elaborating the necessary "adaptive enzyme" to attack the new substrate. The mechanism of adaptation in the light of the present findings and the theory of the equilibrium between the enzymes and their precursors are briefly discussed.

—A. EDEN.

PARR, L. W., & THOMAS, H. (1942.) Search for paracolon in *Bacterium coli-mutabile* populations.—*J. Hered.* 33. 93-96. 785

One of the reactions of the coliform group of bacteria is lactose fermentation, with the production of acid and gas; nevertheless certain members of the group, including the so-called "paracolon" bacteria, do not ferment lactose, and other members ferment it only slowly, incompletely, or at certain temperatures. *Bact. coli mutabile*, for example, when plated on lactose-indicator agar medium, produces colourless colonies which at first show no evidence of lactose fermentation, but after some days papillae grow out of the original primary colonies and take on a colour connoting lactose fermentation. Subcultures into broth from such a secondary colony give prompt and typical lactose fermentation. On the other hand, a subinoculation from the original colony, before the secondary colony appears, or from the original colony but with no contact with the secondary colony, results in growth in lactose broth with only delayed fermentation. The organism thus yields both a prompt lactose-fermenter or "mutant" and a slow lactose-fermenter which breeds true, but from which a prompt fermenter can be obtained at will.

In previous work by PARR *et al.* (1933) it had been noted that among the progeny of a citrate-positive organism there might be found individual cells which had failed to acquire the characteristic of utilizing citrate as a sole source of carbon. Selection of such cells gave rise to true-breeding, citrate-negative lines, which were otherwise culturally and serologically identical. With this in mind the authors studied 59 strains of slow lactose-fermenting *Bact. coli mutabile* derived from a variety of sources. A prompt fermenting mutant was derived from each and plated on plain agar, to avoid any influence of lactose. From such a plate, a number of colonies were picked to lactose broth, a second plating was carried out, and so on, until 468 plates had been made from the 59 strains and 12,113 colonies had been fished to lactose broth. Lactose fermentation was observed in every case. A second method entailed multiple subcultures of secondary colonies. 799 well isolated secondary colonies were grown on Endo's lactose-indicator plates and subinoculated to lactose broth. The lactose was always fermented. Not every well isolated colony developed secondary colonies and in order to see whether such colonies contained true lactose-negative bacteria in whole or part, colonies were picked to lactose broth. In no instance was a typical non-fermenter obtained, although the colonies examined gave rise to atypical fermentation, differing from the

24-hour-old colonies of *Bact. coli mutabile* in that typical acid and gas production was not observed.

Thus no true non-lactose-fermenting coliform bacteria could be detected in populations of *Bact. coli mutabile* by any of the methods employed.—S. M. G.

SCHNEIDER, H. A., & WEBSTER, L. T. (1945.) Nutrition of the host and natural resistance to infection. I. The effect of diet on the response of several genotypes of *Mus musculus* to *Salmonella enteritidis* infection.—*J. exp. Med.* 81. 359-384. 786

A diet of whole wheat and dried whole milk promoted a higher survival rate among white Swiss mice which had been infected with *S. enteritidis* than that promoted by a synthetic diet of glucose, casein, salts and cystine supplemented with all the vitamins known to be essential for the mouse. The ability of diet to condition natural resistance was found to depend on the genetic constitution of the mice employed and could be demonstrated only in a strain which was moderately inbred and was characterized by a certain degree of genetic variability, i.e., it was by no means homozygous. It could be demonstrated in three highly inbred strains of mice selected so that they differed predictably from one another in natural resistance. Substitution of whole wheat or dried whole milk for part of the glucose of the synthetic diet, showed that the nutritional factors involved are present in the wheat, but not in the dried milk. The nature of these factors is as yet undetermined.—E. M. CRUICKSHANK.

MONTEVERDE, J. J., & SIMEONE, D. H. (1944.) *Salmonella* genuinely aviarum en aves "reaccionantes" [The detection of pathogenic salmonella in poultry].—*Inst. Enferm. infect., Fac. Agron. Vet., Univ. B. Aires*. 1. No. 10, pp. 30. [English and Portuguese summaries.] 787

In this experiment 500 birds were blood-tested, the reactors being destroyed immediately and examined; salmonella were found in 69 of the 91 reactors. Agglutinin titres of the "non-infected" reactors ranged from 1:20 to 1:1,280. [There was no investigation to determine the number of carriers among the birds not reacting to the blood test.]

Organisms were isolated in the majority of cases from the ovary, but were also found in the anterior and posterior oviduct and in the intestinal canal. *S. pullorum* was isolated from the majority of the infected birds, *S. gallinarum* from a few and *S. typhi-murium* from one only. Several birds had a mixed infection. It is worthy of note that salmonella organisms were isolated from four out of five birds which reacted to the rapid test and gave a titre by the tube test of 1:20 or less.

The authors find that in the rapid test, a formal-killed antigen is superior to a heat-killed culture. Care should be taken to ensure that cultures are in the smooth phase. Possible sources of error in the agglutination test are infection of the bird with such organisms as *S. typhi-murium*, members of the genus *Escherichia*, "slow lactose fermenters", paracolon bacilli, or aberrant coliform bacteria, and reaction due to vaccination against fowl typhoid.

For routine diagnosis, material is enriched in tetrathionate broth and organisms are isolated on litmus lactose agar and brilliant green agar. Suspicious colonies are tested with antiserum and examined for lack of motility and for their reactions in dulcitol, glucose, maltose and d-tartrate. All the strains of *S. pullorum* and *S. gallinarum* isolated were examined in a wide range of carbohydrates. Thirty-four out of 63 strains of *S. pullorum* were found to be anaerogenic. Some strains attacked maltose, but none fermented dulcitol.

S. gallinarum strains regularly fermented maltose and dulcitol, but never sorbitol.—I. W. BROCKLEHURST.

ANON. (1945.) Pullorum disease.—*Canad. J. comp. Med.* 9. 176. 788

The control of pullorum disease in Canada has in recent years been complicated by strains of *Salmonella pullorum* which differ in antigenic qualities from those which, for many years, have been employed in the standard antigen. An increase of infection due to the variant type of organism occurred apparently through failure of the antigen to detect birds infected with it. Serological differences are most marked in the earlier stages of the infection. Neither of the variant nor the regular type of antigen can be depended upon to detect both types of infection. A mixture of the two types as a tube antigen was not very satisfactory, but a mixed antigen for whole blood testing gave very close agreement with regular and variant antigens in tests on birds infected with regular and variant strains of the organism.—R. GWATKIN.

DE ROPP, R. S. (1945.) The propagation of *Brucella abortus* in the mouse.—*J. comp. Path.* 55. 85-92. 789

Two strains were used in these experiments, strain 544, of high virulence for cattle and g. pigs and strain 19, of low virulence for these animals. Four routes of inoculation were used and two doses of 300,000 and 300 organisms respectively. A chronic type of infection followed and no deaths occurred.

Strain 544 propagated in the mouse more readily than strain 19 but the difference was not so marked as in g. pigs. Intravenous or intracerebral inoculation resulted in a far higher degree of infection than intramuscular or intraperitoneal inoculation. Infection attained its maximum within a week of inoculation and had not significantly altered 3-5 weeks later. Propagation was strongly influenced by the size of the dose. With 300 organisms only a slight infection, which did not increase, was produced. Intracerebral inoculation was followed by a transient brain infection with more persistent infection of the liver and spleen. Pathological changes in brains, livers and spleens of infected mice are described. The mouse is considered much less valuable than the g. pig for comparing the degree of virulence of different strains of *Br. abortus*.—S. J. G.

MARGOLIS, G., FORBUS, W. D., & KERBY, G. P. (1945.) The reaction of the reticulo-endothelial system in experimental brucellosis of dogs.—*Amer. J. Path.* 21. 753-777. 790

The authors investigated the possibility of an aetiological relation between brucella infection in man and Hodgkins' disease and describe the pathological anatomical findings in a group of dogs in which infection by *Brucella suis* had been maintained for long periods by repeated inoculations. A strain of *Br. suis* recovered from a case of Hodgkins' disease was injected into seven dogs and a strain of *Br. suis* recovered from a pig was injected into two others; the results are described for each animal. All of four dogs inoculated intravenously were seriously infected and two died. It is evident however that dogs have a remarkable resistance to brucella infection and generally recover quickly when inoculations are discontinued. Intraperitoneal inoculations were ineffective in establishing clinical disease, regardless of the number of inoculations given, although the organisms were recovered in blood cultures from two dogs.

The gross and histological findings are discussed. The most important lesion was a sinusoidal reaction within the lymph nodes consisting of the proliferation of a mass of large mononuclear cells and the accumula-

tion of a great number of polymorphonuclear leucocytes. Anatomical alterations in the reticulo-endothelial system resembling the changes occurring in Hodgkin's disease did not occur; if brucella infection is related aetiologically to Hodgkin's disease, there must therefore be certain factors involved that are not yet ascertained.

—S. J. GILBERT.

MOORE, T., & MACKIE, C. (1945.) Factors affecting the tube agglutination test for Bang's disease.—*Canad. J. comp. Med.* 9. 192-196. 791

Three sets of serum dilutions prepared from each of 250 samples were incubated motionless for 24 hours at 37°C. and for 16 hours at room temperature, motionless for 16 hours at 37°C. and for 8 hours at room temperature and continuously agitated for 16 hours at 37°C. and for 8 hours at room temperature. The longer periods of incubation proved most efficient; agitation greatly reduced the number of reactions.

Five sets of dilutions were incubated at 37°C. for 12, 24, 48, 72 and 96 hours respectively. They were read at the end of incubation and after standing 16 hours at room temperature. At the first reading the number of positive reactions increased with the length of incubation. This was also true for the second reading of the 12, 24 and 48 hour samples but not the 72 and 96 hour samples. The results suggest the advisability of increasing the length of the 37°C. incubation period in both routine tests.

In a third experiment the number of reactions was very much less, both in samples incubated in the water bath at 42°C. for six hours and in samples similarly incubated for two hours, than in samples kept in the hot air incubator at 37°C. for 24 hours and at room temperature for 16 hours. In the water bath, there were fewer reactions when the serum-antigen mixture was completely submerged than when it was half submerged.—P. J. G. PLUMMER.

RAMON, G., LEMÉTAYER, E., & RICHOU, R. (1944.) De la séro-anatoxithérapie antitétanique en général et de son emploi dans le traitement du tétanos déclaré en médecine vétérinaire en particulier. Bases—résultats—précisions ordre pratique. [Séro-anatoxithérapie in the treatment of tetanus, especially in veterinary medicine].—*Bull. Acad. vét. Fr.* 17. 132-138. 792

The treatment is to give a single early massive intravenous dose of antitoxic serum (150-200 thousand units) and at the same time to give a subcutaneous dose of 20 ml. of anatoxin in tapioca. This latter is repeated three times at five day intervals. To get a really strong and lasting active immunity, a further dose of anatoxin is given at the end of six months. From the literature reviewed it appears that this method of treatment not only stands a much better chance of curing a case of tetanus than does serotherapy alone, but that it gives an active immunity to further infection.—R. M. L.

SCHULZ-UTERMÖHL, H. (1944.) Ueber den heutigen Stand der Anaerobenbakteriologie. [On the present

position of the bacteriology of the anaerobes].—*Münch. med. Wschr.* 91. 234-237. [Abst. in *Bull. Hyg., Lond.* 20. 49, copied verbatim. Signed: G. PAYLING WRIGHT.] 793

This article is addressed chiefly to military surgeons and is intended to explain to them the difficulties and pitfalls which beset the bacteriologist in the isolation and identification of anaerobic bacteria commonly found in wounds. It is also a warning to bacteriologists against the use of certain simplified schemes of identification of the clostridia in place of the fuller techniques elaborated by Zeissler. The author quotes figures for the relative frequency of recovery of various anaerobic bacteria from wounds that have been published recently in Germany, which he regards as seriously erroneous through the investigator's use of methods which failed to ensure the isolation of many important anaerobic bacteria. Such failures have been particularly notable in infections with *Cl. oedematiens*, and the author is strongly opposed to the inclination of certain German bacteriologists to revert to the use of mono-valent anti-*Cl. welchii* antitoxin in military surgery in consequence of the alleged infrequency of infections with *Cl. oedematiens*.

*NYIREDY, S. (1943.) [Pathology of malignant oedema in swine].—*Allatorv. Lapok.* p. 1. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 55.] 794

N. describes malignant oedema of the stomach, caecum and part of the colon in a pig. Pathological and bacteriological findings are given.—E. COTCHIN.

ROSEBURY, T. (1944.) The parasitic actinomyces and other filamentous microorganisms of the mouth. A review of their characteristics and relationships, of the bacteriology of actinomycosis, and of salivary calculus in man.—*Bact. Rev.* 8. 189-223. 795

This is a review on the branched and unbranched filamentous micro-organisms respectively of the genera *Actinomyces* and *Leptotrichia*; other filamentous organisms are also discussed in an effort to clarify their hitherto confused relationships.

The aetiology, pathogenesis and diagnosis of actinomycosis in man are discussed, as are also the nature and manner of formation of salivary calculus or tartar, with special reference to these micro-organisms.

—R. R. A. COOMBS.

MORQUER, R., & COMBY, L. (1942.) Etude biologique d'un *Actinomyces* nouveau, pathogène pour le cheval. [Biological study of a new species of *Actinomyces* pathogenic for horses].—*C. R. Soc. Biol., Paris.* 136. 703. 796

A description is given of a new species of *Actinomyces*, *A. caballus*, isolated from a closed subcutaneous abscess; it is a parasite of the horse and non-pathogenic for the rabbit, rat and mouse. A full bacteriological description is given.—R. R. A. COOMBS.

See also absts. 953-955 (mastitis), 894 (strangles), 870, 978 (TB.), 873 (leprosy), 889 (*Haemophilus bovis*), 896, 943 (*Pseudomonas*), 1006 (caseous lymphadenitis), 872 (*Proteus*), 886 (TB., pasteur lla, salmonella), 813, 984 (clostridia), 958, 959 (actinomycosis), 1008 (saccharomycosis in rabbits), 983 (bacterial enzymes), 944-946, 956, 957 (antibiotic agents).

DISEASES CAUSED BY PROTOZOAN PARASITES

*REICHENOW, E. (1943.) Grundriss der Protozoologie. Für Ärzte und Tierärzte. [Outline of protozoology for medical and veterinary practitioners.] pp. vi+98. Leipzig: Johann Ambrosius Barth. RM. 6.60. [Abst. from review in *Jber. Vet.-Med.* 71. 223.] 797

This review claims that the "Outline of Protozoology" gives all the most important parasitological

and zoological facts about the protozoa which are required in practice by the medical or veterinary worker in the tropics. A general section gives essential information on the structure and properties of protozoa, their reproduction, method of development, parasitism and systematic classification, as well as a short article on research technique.

A special section deals systematically with both the pathogenic and harmless protozoan parasites of man and domestic animals, but although pathogenicity, diagnosis and methods of cultivation are discussed, clinical symptoms and methods of treatment are excluded.

It is stated that R.'s wide knowledge of protozoology ensures that his selection of material for a short book will meet the needs of practical workers. The illustrations and general presentation of the book are said to be excellent.—U. F. RICHARDSON.

BLANC, G. (1940.) *Chronique du kala-azar au Maroc. [Chronic leishmaniasis in Morocco.]—Arch. Inst. Pasteur Maroc.* 2. 391-409. 798

Eight cases of human leishmaniasis are described in which the disease ran a chronic course, defying diagnosis. Whilst in some cases a definite diagnosis became possible after death, other cases were ascribed to *Leishmania* only because they responded to treatment with antimony.

A case of leishmaniasis in a dog, the third to be reported in dogs born and reared in Morocco, also came under observation. The disease commenced with loss of hair on the nose and progressed to keratitis. The symptoms responded to antimony injections.—U. F. R.

*SCHAAF, J. Die Trichomonadenseuche (ansteckendes Fröhverkalben) im Generalgouvernement. [Trichomoniasis in Poland.]—*Ber. Forsch. Landw. Pulawy.* 1. No. 2/3. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* (Wien. tierärztl. Mschr. August 4th. 256, (1944).] 799

Trichomoniasis is widespread and causes severe economic losses in the districts of Cracow and Galicia where, as in Germany, the disease occurs principally on small farms which share a bull. As trichomonads have not been detected in blood or in liquid manure and as they would probably not survive putrefaction, it is considered that infection takes place at mating and is therefore to be combated by veterinary and police measures. Artificial insemination has been introduced into Poland for cattle infected with trichomoniasis. [There is nothing new in this paper.]—C. H. S.

WRIGHT, J. G., & ARTHUR, G. H. (1945.) Observations on infertility in a dairy herd with special reference to *Trichomonas foetus* infection.—*J. comp. Path.* 55. 49-62. 800

A detailed clinical account is given of the course and treatment of infertility in a dairy herd consisting of 61 cows, 22 heifers and two bulls.

Of 13 pregnant cows, four aborted and *T. foetus* was found in the foetal fluids; the remaining nine calved to term. Three cows were found to have pyometra associated with *T. foetus*; this parasite was also demonstrated in twelve others. Of the remaining 33 cows, six had recently calved and were not at first involved in the outbreak, although one subsequently aborted after insemination from an infected bull; 27 showed no *T. foetus* and no anatomical abnormality to account for sterility; suboestrus, however, appeared to be an important factor [see MURRAY—*V. B.* 14. 16]. An additional abortion was inadvertently provoked after infected service.

Seven of the heifers were pregnant and carried to term, one had pyometra and *T. foetus* was isolated from three others; suboestrus was a feature in ten, and anoestrus in three.

Two bulls were concerned in the transmission of the disease, but trichomonads were not recovered from them either during life or at P.M. examination.

Treatment of cases uncomplicated by pyometra or abortion was along orthodox lines, by uterine infusions

of aqueous iodine solution. These animals were inseminated artificially with semen from uninfected bulls. Mercuric chloride, 0.01% and metaphen, 0.02% were used on one animal each and it was noted that straining, as produced by iodine, was absent. In five cows motile trichomonads were found 6-16 days after iodine treatment. In this group of animals all the three heifers and 11 of the 12 cows conceived with an average insemination/conception [I/C] ratio of 2 and all carried to term except one heifer, whose foetus was positive for *Corynebacterium pyogenes*.

The three cows and one heifer with pyometra were treated by intramuscular injection of stilboestrol dipropionate, followed by posterior pituitary extract. The cows were treated locally by uterine irrigations with a two-way catheter, and subsequently with iodine infusions; the heifer was given no local treatment. Two of the cows and the heifer eventually conceived and carried to term.

The six aborted cows were treated by uterine infusion of iodine or metaphen solution and five ultimately conceived and carried to term.

Twenty-seven cows and 11 heifers in which trichomonads were not demonstrated but which had been exposed to infection, were treated either with iodine or metaphen intra-uterine infusions, and all except four of the cows subsequently conceived with an I/C ratio of 1.97 and carried to term.

The methods of collection and injection of semen were orthodox: undiluted freshly collected semen was used and as a rule the animal to be inseminated was allowed to stand for collection of semen from the clean bulls. Accidental mating occurred once and the danger attached to this is emphasized in a disease such as trichomoniasis. Hypertrophy of the uterine cervix was noted in many of the animals, but was not found to be a cause of infertility. Abnormalities in the oestrous cycle resulted in a great loss of breeding time as non-pregnant animals often came into observable oestrus at periods of 3-4 months only. Frequently animals coming into oestrus on one or two occasions shortly after calving were served, and although failing to conceive did not return to oestrus for several months; such animals may have aborted, but it appears that this was in most instances unlikely. In addition to suboestrus and anoestrus a condition of cystic ovaries with the absence of heat was noted; P.M. findings on such an animal are recorded. Suboestrus was treated with stilboestrol dipropionate with varying results, expression of the corpus luteum appearing more satisfactory. Pregnant mare's serum was used in anoestrous animals with little success. Three out of seven animals treated were diagnosed as having developed an excessive number of large follicles without ovulation. Similar findings had been noted as the result of the use of pregnant mare's serum on four other anoestrous heifers.—A. E. PIERCE.

KERR, W. R., & ROBERTSON, M. (1945.) A note on the appearance of serological varieties among *T. foetus* strains isolated from infected cattle.—*Vet. Rec.* 57. 221-222. 801

The authors make the important observation that in the strains of *T. foetus* studied by them by the agglutination test [ROBERTSON—*V. B.* 12. 408; KERR & ROBERTSON—*Ibid.*] and the intradermal skin reaction [KERR—*V. B.* 15. 320], at least two different antigenic varieties have been observed, one exemplified by the "Manley" strain [MAHMOUD—*V. B.* 15. 282] and the other by the "Belfast", the Northern Ireland type strain.

Although there appears to be some overlapping in the response of the two strains to the heterologous antibody, this does not become apparent except at high

antibody levels. In field work the diagnosis is more often made with sera of low or moderate titres, so that this degree of distinction may be of considerable practical importance. Tables are given showing the results of the aggl. and intradermal tests on infected animals and clearly indicating the necessity of using the correct strain in both of these tests.

An important note is made that the nature of the antigen cannot be deduced merely from failure to agglutinate, but that the two problems must be investigated separately.—ALAN E. PIERCE.

HAMMOND, D. M., & BARTLETT, D. E. (1945.) An instance of phagocytosis of *Trichomonas foetus* in bovine vaginal secretions.—*J. Parasit.* 31. 82. 802

This observation was made on a vaginal sample from a heifer undergoing her initial infection. Organisms were first recovered on the sixth day following coitus and were present in large numbers until the 26th day; on the following day the animal returned to oestrus. Thereafter, organisms were not noted until the 41st day, with the exception of the 33rd day. A leucocyte with a large vacuole containing an actively moving body considered to be *T. foetus* was observed on the 43rd day when most of the organisms were stationary.

Many other leucocytes containing vacuoles were observed, but appeared to be empty of formed matter. The authors considered it likely that at this period of the infection the activity of the leucocytes was a factor in reducing the numbers of trichomonads in the vagina. —ALAN E. PIERCE.

CAMPBELL, J. G. (1945.) An infectious enteritis of young turkeys associated with *Cochlosoma* sp.—*Vet. J.* 101. 255-259. 803

C. records the occurrence of *Cochlosoma* sp. in large numbers in the intestines of turkeys with a condition indistinguishable from infectious catarrhal enteritis caused by *Hexamita* sp. The outbreak occurred in the early summer on a turkey farm in N.E. Scotland, young birds, 2-10 weeks old, being affected. Symptoms consisted of an intense thirst followed by watery, frothy diarrhoea, depression, drooping head, closed eyes, loss of appetite, weakness, coma and death. The intestinal tract was atonic, one of the most characteristic lesions was the presence of dilations in the wall which contained yellowish froth and the mucosa was congested. The gall bladder was somewhat distended and there was an oedematous condition of the connective tissue in this region.

The disease appears to be extremely infectious and deaths of almost the whole of the young stock occurred within 2-3 days of the appearance of symptoms.

Diagnosis can only be made with fresh, warm material as the flagellates die within a few hours of the death of the host. A valuable description of the protozoon is included in the text.—C. HORTON SMITH.

HAWKING, F. (1945.) Growth of protozoa in tissue culture. I. *Plasmodium gallinaceum*, exoerythrocytic forms.—*Trans. R. Soc. trop. Med. Hyg.* 39. 245-263. 804

Although the satisfactory cultivation of endoerythrocytic forms of *P. gallinaceum* has not yet been achieved, the present paper describes what is essentially the first satisfactory demonstration that malaria parasites can be cultivated *in vitro* for a considerable length of time. Cultivation of the exo-erythrocytic forms is carried out in tissue cultures of chicken cells of the macrophage-reticulo-endothelial type and cultures may be prepared from the spleen, buffy coat of centrifuged blood, marrow, etc. Active multiplication of the parasites occurs and living parasites can be recovered

from these cultures after 89 days. Growth will take place in medium containing 10 units of penicillin per ml. Chickens can be inoculated from the cultures and exo-erythrocytic forms appear at an early stage of the resulting infection which is similar to the infection produced by sporozoites. The infection can also be passed to cultures of uninfected chick tissues but the results of passage are unreliable. No success attended attempts to infect erythrocytes from these cultures. Cultures have been prepared from spleen of chickens inoculated intravenously with sporozoites one hour beforehand. Attempts to infect chicken cell cultures by sporozoites were not successful.—C. HORTON SMITH.

*ZAIN, H. (1942?) Zur Entstehung der Endothelformen der Vogelmalaria (*Plasmodium gallinaceum*). [The occurrence of endothelial forms of avian malaria (*Plasmodium gallinaceum*).]—*Klin. Wschr.* 20. 176-177. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* 50. 512.] 805

The pigment-free exo-erythrocytic parasite stages present in avian, simian, and human tertian malaria as the so-called E-stages or E.E. forms are produced from sporozoites; it has not yet been proved experimentally whether they can also be formed from the erythrocytic stages as well. S. experimented with fowl malaria and found that the time of year and the breed and age of the fowls were without influence on the time when E.E. forms appeared. The first parasites of the plasmodial stock, which was introduced only by animal passages and without the use of *Aedes*, usually appeared in the blood 6-9 days after infection. The peak of blood infection occurred between the 10th and 17th days. After the 22nd day parasites were usually no longer to be found in the blood smear. When citrated blood, rich in parasites, was centrifuged at 2,000-3,000 r.p.m. the plasma proved to be infective when introduced intravenously. By suitable filtration through filters with an average pore diameter of as much as 22μ , S. showed that free merozoites cannot be regarded as infective. Endothelial stages were never found in the filter residue. On the other hand, mature schizonts may prove to be the source of origin of the E-stages.—C. H. S.

HAAS, V. H., & EWING, F. M. (1945.) Inoculation of chick embryos with sporozoites of *Plasmodium gallinaceum* by inducing mosquitoes to feed through shell membrane.—*Publ. Hlth Rep., Wash.* 60. 185-188. 806

A method is described and illustrated by means of which chick embryos can be infected by the bite of sporozoite-carrying mosquitoes. Eggs which have been incubated 10-13 days are used. The position of one of the larger chorio-allantoic vessels near the surface is located under a candling lamp and marked by a pencil line. A cut through the eggshell is made with a dental carbon disc, exposing but not penetrating the membrane. The infected mosquito in a glass globe, the open end of which is covered with mosquito netting, is held over the cut in the eggshell. The cut is first moistened with a drop of saliva on a glass rod.

The survival of chick embryos infected by this method was better than that obtained by other techniques.—M. C.

RIGDON, R. H. (1945.) *Plasmodium lophurae* infection of the chick embryo.—*Amer. J. Hyg.* 42. 189-194. 807

P. lophurae infections can be produced in chick embryos by the injection of parasitized blood from both infected ducks and chicks. Infections do not develop when parasitized blood is injected into the yolk sac. Young chicks appear to be more suitable hosts than embryos for the multiplication of *P. lophurae*. Chicks

injected as embryos with *P. lophurae* may hatch with malaria parasites in the erythrocytes of the peripheral blood or the parasites may subsequently appear in the cells in the blood stream. Pigmentation and splenomegaly are exhibited by chick embryos infected with *P. lophurae*.—C. HORTON SMITH.

WOLFSON, F. (1945.) Virulence of the IG strain of *Plasmodium relictum* for the duck.—*Amer. J. Hyg.* 42. 111-118. 808

The IG strain of *P. relictum* was received from England in a canary. The strain was introduced into a duck and passed through more than 50 semi-weekly transfers. Observations were made on the anaemia and parasitaemia resulting from the inoculation of a series of ducks with a standard dose of parasites at regular intervals. The IG strain produced very mild infections in the duck when first inoculated from the canary. Control canaries inoculated with equal doses developed severe infections. The change from canary to duck did not change the morphology of this strain of *P. relictum*. Every tenth transfer of the parasite through ducks was accompanied by a definite increase in the severity of the anaemia and parasitaemia. W. found that 40 semi-weekly intravenous transfers of this strain of *P. relictum* through ducks were sufficient to produce a sharp peak of parasitaemia on the fourth day after inoculation. It was found that up to the 40th transfer only doses larger than the standard of 3,000 million parasites per kg. body weight proved fatal to the two-week-old ducks. After the 40th transfer the standard doses caused some deaths which occurred usually within the first week after inoculation. A satisfactory method of adapting *Plasmodium* to a new host to which it is only slightly susceptible on the first transfer is by a rapid passage of the *Plasmodium* through the new host. —C. HORTON SMITH.

WOLFSON, F. (1945.) Effect of preservation by freezing upon the virulence of *Plasmodium* for ducks.—*Amer. J. Hyg.* 42. 155-166. 809

This investigation was made to determine whether low-temperature freezing and subsequent thawing would maintain the high virulence of *Plasmodium* for the duck. Successful preservation by freezing would eliminate semi-weekly transfers during intervals between experiments, as well as accidental loss of species or strains. Samples preserved under identical conditions showed little variability in the proportion of erythrocytes surviving freezing and thawing and the proportion of erythrocytes and probably of parasites surviving preservation varied directly with the proportion of parasitized erythrocytes in the sample of blood before freezing. W. found that *P. cathemerium* preserved for two days to a year showed no change in the length of the prepatent period in inoculated ducks, the interval between inoculation and the peak of infection, and the degree of parasitaemia at the peak. *P. relictum* and *P. lophurae* were not appreciably different from *P. cathemerium* in their ability to withstand freezing and thawing, but the infectivity of the three species appeared to decline in the following order: *P. lophurae*, *P. cathemerium*, *P. relictum*. The virulence of *P. cathemerium* was not appreciably reduced by preservation. —C. H. S.

BRUMPT, E. (1944-1945.) Anophélisme sans paludisme et régression spontanée du paludisme. [Spontaneous disappearance of malaria from areas where *Anopheles* persist.]—*Ann. Parasit. hum. comp.* 20. 67-91. 810

B. discusses with special reference to human malaria the factors concerned in bringing about retrogression and the disappearance of insect-transmitted disease without a corresponding retrogression in the numbers of the vector. The disappearance of malaria

from England and parts of Holland and Germany is considered to be due to the fact that the causal parasite in these areas was particularly sensitive to quinine and that climatic conditions favourable for transmission occur only during a period of a few weeks each year. In Normandy and Brittany malaria has practically disappeared, although the transmitting anopheline mosquito is still abundant. Here the human reservoir of infection has become insufficient to maintain infection in the mosquito, but in exceptional circumstances, as during the wars of 1914-18 and 1939-45, epidemics occurred when sufficient numbers of infected people entered the area. In these areas, B. considers that one of the factors responsible for reduction of the disease incidence has been the systematic use of quinine which, although it may not bring about rapid, complete cure, reduces the number of gametocytes in the blood to such a level that infection of the mosquito becomes very difficult. Along with this has been a rise in the standard of nutrition and a great increase in the practice of country people going outside the area for summer holidays at times when the mosquito is abundant. Reduction in the birth rate has reduced the proportion of young children in the population and so reduced the numbers of the most important carriers of infection.

B. discusses at some length the possibility that by a process of evolution new biologic strains of the transmitting mosquitoes have been produced which are resistant to infection with the malaria parasites, but does not consider this to be an important factor.

Other factors which are of importance are the housing of cattle in the vicinity of human dwellings, alterations in methods of agriculture, drainage of marshes, improvement in economic conditions leading to better nutrition, and more widespread use of quinine and other methods of treatment.—M. C.

BRUMPT, E. (1944-45.) Zoophylaxie du paludisme. [Zoophylaxis of malaria.]—*Ann. Parasit. hum. comp.* 20. 191-206. 811

B. reviews zoophylaxis, a method of malaria control which aims at attracting to cattle sheds, stables, etc., the greatest possible number of those species of anopheline mosquitoes which attack man. Much depends upon the habits of the particular species of mosquito concerned, and B. considers that the type of cattle shed or stable is of greater importance than the animals which are housed in them. Species which normally bite only animals and live mainly in stables and cattle sheds will bite man when he enters such buildings.

As a general rule the larger animals with their greater surface area are more attractive to mosquitoes, but some species appear to prefer cattle to horses or pigs whereas in others preference is reversed.

The value of zoophylaxis in areas where *Anopheles maculipennis* is the chief vector of malaria is considered in detail. Here the fact that this species has numerous biotypes, some with a marked preference for human blood and others for the blood of domestic animals, is of great importance. Conditions which may result in the replacement of one biotype by another are discussed. These include drainage, the relative number of domestic animals as compared with the human population, etc. Many authors consider that zoophylaxis is a valuable weapon, while the experience of others is unfavourable. Success appears to depend on the erection of the livestock houses between the breeding place of the mosquitoes and human habitations, the correct distances between human dwellings and livestock sheds and the nature of these sheds. The sheds must furnish conditions attractive to mosquitoes, e.g., warmth, humidity, darkness and shelter from wind.

At the same time the human dwelling places should be rendered less attractive by better lighting and ventilation.

Areas in which species other than *A. maculipennis* are the vectors are reviewed separately. Summing up the experiences of various authors, B. concludes that much depends on the species of mosquito and the equilibrium between mosquitoes and animals. In malarial areas which are being developed, zoophylaxis is of considerable value, but it might become a two-edged weapon if for some reason such as a disease epizootic, famine, or war the number of animals was suddenly greatly decreased.—M. C.

YAKIMOV, V. L. (1940.) Ob "anaplazmoidnykh formakh" pri nuttallioze loshadei. ["Anaplasmod forms" in equine nuttalliasis.]—*Veterinariya, Moscow*. No. 5. pp. 56-59. [Abst from French summary.] 812

The nature of the punctiform bodies seen in the red corpuscles of horses affected with nuttalliasis is discussed. These are stated to appear when recovery begins and the organisms are being subjected to unfavourable conditions either as a result of chemotherapy or the development of antibodies.

Y. also suggests that these forms may persist in a latent state and may give rise to relapse when the horse is subjected to unfavourable conditions.—M. C.

MARSH, H. (1945.) *Leptospira* in bovine icterohemoglobinuria.—*J. Amer. vet. med. Ass.* 107. 119-121. 813

After losing 25 calves from haemoglobinuria in the spring of 1944, an owner brought a dead calf for examination. Autopsy revealed a peculiar pinkish colour of the serous membranes, slight enlargement of the spleen, petechiae in the kidneys and a red discoloration of the urine. Histologically the liver showed focal necrosis and some leucocytic infiltration. Kidney tissue showed cytoplasmic degeneration in the glomeruli, an area of plugging of the convoluted tubules with

See also absts. 871, 873 (malaria), 876, 960, 1007 (trypanosomiasis), 847 (bovine piroplasmosis), 961 (anaplasmosis), 980, 985 (*Trichomonas foetus*).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

CABOT, D. (1945.) Foot and mouth disease: Its epizootiological aspect.—*Vet. Rec.* 57. 375-377. Discussion pp. 377-379. 815

C. reviews some of the epizootological aspects of F. & M. disease, with special reference to the introduction of infection to Britain. This introduction of infection can be classified in three ways.

In the first class are the outbreaks which have occurred in the eastern and south-eastern counties of England, in which there is no doubt that the disease originated on the European Continent but where there is no obvious channel of infection except, possibly, the introduction of the disease by migrant birds. Infection may also result from the importation of diseased animals. The importation of cattle, sheep and swine is prohibited except from Ireland, the Isle of Man, the Channel Islands and Canada. The disease has occasionally been introduced in this way from Ireland, the last occasion being in 1942, but the disease was confined to two landing places by means of the slaughter policy. Finally there is the introduction of infection by chilled and frozen meat imported from infected countries. During 1944 there were 93 initial outbreaks, of which 78 primarily affected pigs, practically all of which were fed on kitchen waste. A number of outbreaks occurred on the premises of butchers who at the time were

leucocytes and an engorgement of capillaries of the medulla, which contained broken-down red cells. *Clostridium welchii* Type A was found in abundance in the intestine and no further calf losses occurred after the administration of Type A antiserum. After the publication of work by JUNGHER [V.B. 15. 185], however, a re-examination of sections by the Levaditi method was made and scattered leptospira were seen in the liver sections and in the interstitial tissue between the tubules of the kidney. The disease appeared to resemble that described by Russian authors as bovine icterohaemoglobinuria [V.B. 12. 338 & 13. 422].

—U. F. RICHARDSON.

SKIBSTED, S. (1945.) Om Forekomsten af Sarkosporidier. [Incidence of sarcosporidia.]—*Maanedsskr. Dyrlaeger.* 57. 27-34. 814

S. quotes from the literature on sarcosporidiosis in domestic animals, and describes his investigation at an abattoir for swine in Denmark in the course of routine examinations for trichinae, the same samples of muscle being examined for sarcosporidia [for Miescher's tubes at the magnification used]. Only 1.26% (340 among 26,879 pigs) were found to be infected, probably an error on the low side, as the search was somewhat cursory. Four cases of generalized muscle infection were found, these being condemned *in toto* in accordance with the meat-inspection regulations. Advantage was also taken of the facilities available to examine 100 slaughter cattle by serial samples up to seven in number, i.e., when negative results were obtained with one sample, others were taken and examined. In this way 94 animals were found to be affected, of which 62 were detected at the first test. Ninety-seven calves were also examined and 18.5% were found to be infected. Jutland calves were 37.5% infected and Zealand calves only 5.3%, a finding of local variation in accordance with the knowledge of this condition.

Of a number of hares, fowls and pheasants examined only one cock was found to be affected.—J. E.

distributing South American meat; in a few of these cases the disease did not start in pigs but in cattle that had access to meat wrappers. During the same period there was no disease in parts of the country self-supporting in meat and on farms where only centrally sterilized kitchen waste was fed to pigs. The South American republics were the only countries supplying meat to Britain that were infected with F. & M. disease during this period and there is no doubt that it was from these countries that infection was introduced to Britain.

A short account is given of the use of serum and vaccine in other countries.—W. M. HENDERSON.

RUSHMORE, R. W. (1945.) Waldmann vaccine for foot-and-mouth disease in liberated Italy, 1944.—*Bull. U.S. Army med. Dep.* No. 89. pp. 94-97. 816

This is a detailed report by a U.S. Army Veterinary Corps officer of the preparation of aluminium hydroxide vaccine by the Veterinary Laboratory at Rome, following the city's liberation in 1944.

Virus filtrate was prepared as follows. A strain of virus isolated from a naturally infected bovine was used for intradermal inoculation of the tongues of donor cattle in the Rome abattoir. Twenty-four hours later the cattle were killed and the tongues removed; lymph and epithelium were collected, frozen, ground and

washed three times with distilled water to give a 1:11 suspension, which was then passed through a Seitz EK filter. The meat from these cattle was distributed to civilian hospitals in Rome, no illness attributable to the meat was reported. Six hundred bovines were inoculated in this manner for the production of 36,000 doses of 50 ml. of vaccine.

The method for the preparation of 20 l. of aluminium hydroxide solution was as follows: 880 g. ammonium sulphate were dissolved in 20 l. water at 63°C. and 1,500 g. aluminium ammonium sulphate were dissolved in 4 l. of water. These solutions were mixed and 2 l. cold ammonia, followed by 50 l. water were added, the whole being stirred for 15 min. and the liquid portion being removed by a centrifuge separator. 60 l. water with 10 ml. ammonia were then added to the sediment and centrifuged as above; this washing was repeated five times. Finally the solid portion was collected in 20 l. water, sterilized at 105°C. for 30 min. and allowed to stand for six days.

The vaccine was prepared from 5 parts aluminium hydroxide solution, 4 parts buffer solution, and 1 part virus filtrate, being mixed and shaken for 30 min. Formalin was added to give a concentration of 1:2,000 and the whole shaken for 30 min., bottled and stored at 25°C. for 48 hours and then at 5°C. for at least 96 hours before use, the expiry date being three months from the date of manufacture. The buffer solution consisted of 0.2% sodium hydroxide and 0.5% glyocoll solutions in proportion to bring the pH of the vaccine to 9. This proportion was usually 1 part sodium hydroxide solution and 1.7 parts glyocoll solution. Batches of vaccine were tested for inactivation by the subcutaneous inoculation of ten cattle with 60 ml. No tests were made of the virus content of the filtrate or of the efficiency of the vaccine.

In Rome Province 15,000 dairy cattle and calves were vaccinated; no disease was reported amongst these animals although six non-vaccinated herds became infected within the first four months of the date of vaccination. By the end of 1944, 36,000 doses had been distributed. [This method of preparation of the vaccine is very similar to that described by WALDMANN—see *V. B.* 9. 17—but more details of the technique are given.]—W. M. HENDERSON.

GILYARD, R. T. (1945.) *Bat transmitted paralytic rabies.*—*Cornell Vet.* 35. 195-209. 517

Bat-transmitted paralytic rabies is principally a disease of cattle, dogs being rarely affected, presumably as they are not readily attacked by vampire bats. The disease differs epidemiologically and immunologically from canine rabies and presents a different problem of control. It was first reported as an epizootic in cattle and horses in Brazil in 1908, but may have existed earlier as animal deaths after bat bites were noted by the earliest colonists. Negri bodies were first demonstrated in bats in Trinidad in 1931.

Notes are given on species of bats and their habits; whilst the principal carrier is the vampire bat (*Desmodus*), infection may spread from them to the fruit- and flesh-eating bats which may then attack animals. Infected bats have been known to attack animals in daylight.

In bat passage, the rabies virus appears to undergo certain biological modifications evidenced by pathogenic potentialities and immunogenic properties, but whereas in Trinidad vaccine prepared from the Pasteur fixed virus appeared to give the best immunity to both canine and bat strains of rabies, in Venezuela the vaccine prepared from paralytic rabies was preferred; tests of this vaccine in the U.S.A. indicated that it had a highly significant polyvalent antigenic power which was lacking in fixed virus vaccine.

Bat-carried rabies is recorded in horses, mules, goats, swine and sheep; two cases in dogs have occurred in Trinidad, but 90% of cases occur in cattle. In Trinidad 100 human cases have occurred, but human infection does not appear to occur in South America, where the disease is one of range cattle. In cattle the disease is characterized by progressive paralysis, beginning with inability to extend the hind fetlocks (knuckling). There may be a preliminary stage of paraesthesia not unlike that of "mad itch". In recumbency there is a tendency to lie with the fore-legs extended. Profuse salivation occurs when paralysis extends to the throat. Death usually occurs on the fifth day.

Control measures in Trinidad consist of bat destruction and vaccination, the vaccine for animals being prepared in calves' brains. The disease was prevalent in 1928-36, and since then outbreaks have occurred in 1938 and 1944.

In Venezuela and Brazil, control measures are confined to vaccination, except that in Brazil thousands of dogs have been destroyed, although canine infection cannot be incriminated as the source of infection in the extensive disease of cattle.—U. F. RICHARDSON.

*WONG, T. (1941.) *Virus culture with special reference to that of rabies.*—*Thesis, Cornell.* pp. 24. 818

In this general discussion and summary of information W. covers such aspects as the nature of viruses, their size, culture, purification, tissue specificity and the effect of physical and chemical agents. No original work is reported.—H. L. GILMAN.

*KAISER, M. (1942.) Bericht über Versuche einen Trockenimpfstoff für den Pockenschutz herzustellen und über den Einfluss von Kalte und Trocken auf das Vaccinavirus. [Preparation of a dry vaccine against variola.]—*Arch. ges. Virusforsch.* 2. 426-459. [Abst. from abst. in *Bull. Inst. Pasteur.* 42. 91-92.] 819

Full details are given in the original article of the method of preparation of a dry vaccine from vaccine lymph; by this method the number of vaccination doses prepared may be increased. Vaccine lymph is taken after 5-6 days, ground up and centrifuged, and the supernatant fluid, with glucose or gelatin added to increase the bulk of the product, is frozen and dried *in vacuo*. The dry product resists -78°C. for one week and is still active, if not too much diluted, after six years at 0°-2°C.—E. COTCHIN.

*BRIDRE, J. (1942.) Rapports entre les varioles humaine et animales. [Relationship of human and animal variolas.]—*Bull. Soc. Path. comp.* June 9th. Also appeared in *Rev. Path. comp.* Sept.-Oct. p. 379-390. [Abst. from abst. in *Bull. Inst. Pasteur.* 42. 87-88.] 820

The question of the unity or plurality of the pox viruses is still far from answered. A certain community of origin is indicated by the cross-immunity between certain viruses, but attempts to transform the pox virus to vaccinia virus in the rabbit cannot be considered as successful, a previously unrecognized cause of error being that rabbits quite often show a spontaneous pox disease, the virus of which cannot be distinguished from that of vaccinia. Analogous causes of error would invalidate similar attempts to transform one animal pox virus to another; although it would be rash to deny the possibility of such a transformation, the conditions under which it could occur are still almost unknown.—E. COTCHIN.

HORGAN, E. S., & HASEEB, M. A. (1945.) *Vaccinia*

virus. Immunological unity of different strains.—*Lancet*. 249. 170-171. 821

The immunological behaviour of six strains of vaccinia virus was examined using calves, sheep, rabbits and monkeys. The results indicate that irrespective of the origin of the strain or the animal used for preparation of either immunizing or test doses, the strains were immunologically identical.—W. M. HENDERSON.

McLEAN, I. W., JR., BEARD, D., TAYLOR, A. R., SHARP, D. G., & BEARD, J. W. (1945). The relation of antibody response in swine to dose of the swine influenza virus inactivated with formalin and with ultraviolet light.—*J. Immunol.* 51. 65-99. 822

The authors studied the relationship of virus mass in influenza vaccines to the level of antibody titre induced in the vaccinated host. The virus was the egg-adapted strain of swine influenza, concentrated and purified with the Sharples' centrifuge. The experimental animals used were 120 pigs of 14-20 weeks of age. Materials and methods are discussed at great length, particularly the preparation of the formal and ultraviolet vaccines. Antibody response was measured by means of inhibition of the haemagglutinating properties of untreated swine influenza virus.

The results show that the degree of antibody response of swine is related to the dose per unit weight of vaccine; also that the size of the vaccination dose is a factor of relative influence, in that a 100-fold increase in dose of vaccine increased the antibody response two and a half times. The single dose of vaccine was found to be relatively ineffective, the antibody response sinking to a low level after three weeks. The results of a second vaccination, however, took six weeks to reach the same low level. The authors believe that multiple injections of vaccine are more likely to maintain a high antibody level throughout an influenza season.

—W. R. KERR.

BEARD, J. W., SHARP, D. G., TAYLOR, A. R., McLEAN, I. W., JR., BEARD, D., FELLER, A. E., & DINGLE, J. H. (1944). Ultracentrifugal, chemical and electron microscopic identification of the influenza virus.—*Sth. med. J.* 37. 313-320. [Abst. in *Bull. Hyg., Lond.* 20. 50, copied verbatim. Signed: D. J. BAUER.] [See also *V. B.* 15. 321.] 823

Influenza virus present in infected chorio-allantoic fluid was concentrated by absorption with red blood cells, elution with Ringer solution, and ultra-centrifugation at 20,000 g. for one hour. Inoculation experiments showed that the sediment contained 20-25 per cent of the original infectivity. The sediment was resuspended and its sedimentation constant was determined with the ultracentrifuge; for influenza virus type A, $S_{20}^0 = 724 \times 10^{-13}$, for type B, 832×10^{-13} , and for swine influenza virus, 622×10^{-13} . An electron micrograph of the type A strain is given, showing that the virus particles are rounded or ovoid, often with a central opacity. The average particle diameters found by measurement were:—type A, 78 m μ , type B, 98 m μ , swine influenza virus, 78 m μ .

Starting with 100 cc. chorio-allantoic fluid, the purification method yielded 5 mgm. of virus type A, and 2 mgm. each of type B and swine influenza virus. Chemical tests carried out on the three viruses showed the presence of fat, carbohydrate and protein, together with nucleic acid of the desoxy-pentose type.

TAYLOR, A. R., SHARP, D. G., McLEAN, I. W., JR., BEARD, D., & BEARD, J. W. (1945). Concentration and purification of influenza virus for the preparation of vaccines.—*J. Immunol.* 50. 291-316. 824

For the production of concentrated influenza virus vaccine suitable for large-scale vaccination trials, special

apparatus is required. In this article, directions are given for the cultivation of the virus in chick embryos and the harvesting of the infective fluid under aseptic conditions, the concentration of the virus in a modified Sharples' centrifuge, and the subsequent recovery of the concentrated preparation. At a speed of 44,000 r.p.m. (47,000 g.) a high degree of purity was obtained in a single sedimentation. One centrifuge can handle the fluid from 4,500 eggs per day and will deal with 1 litre of allantoic fluid per hour.

The final virus product is so free from extraneous matter that it can be standardized by a simple chemical analysis for nitrogen or carbon.

The article should be consulted in the original for details of the construction of the apparatus.

—R. E. GLOVER.

ANON. (1944). The inhalatory route for prophylaxis and treatment of experimental influenza. I. The distribution of inhaled material. II. Immune serum in prophylaxis and treatment.—*Amer. J. med. Sci.* 207. 40-47 & 47-60. [Abst. in *Bull. Hyg., Lond.* 20. 52-53, copied verbatim. Signed: WILSON SMITH.] 825

In the first section of this paper, the authors describe an improved atomizer constructed from a flask and glass tubing, capable of delivering uniformly small particles at the rate of 55 to 65 cc. per hour but operating at relatively low pressures (about 40 cm. Hg). The penetration of atomized india ink suspension into the lung substance of a *Macacus rhesus* monkey was studied. After confinement in an atmosphere sprayed for one hour, carbon was found to have penetrated into the alveolar spaces and was readily detected immediately below the visceral pleura. The distribution of carbon following intranasal instillation under ether anaesthesia was more irregular with much less penetration to the alveoli and considerable loss from swallowing. Experiments with a suspension of radioactive chromic phosphate confirmed the high penetrating efficiency of the spray inhalation method. A distillation effect during spraying leads to increased concentration of the particulate matter in the atomizer.

In the second section an attempt is made to assess the value of spray inhalation of influenza immune serum in prophylaxis and treatment. Considerable protection of mice against subsequent intranasal infection with virus could be conferred, either by inhalation or intranasal inoculation of the serum. With inhalation, degree of protection increased with time of exposure, but the method compared unfavourably with simple intranasal inoculation. Thus one hour's spraying of a 2½-fold dilution of immune globulin was required to give approximately the same degree of protection as an intranasal inoculation of 0.05 cc. of a 1 in 74 dilution. The authors attribute this discrepancy to the distillation effect during the spraying.

From experiments in which the intranasal route of inoculation was used, the following conclusions are drawn:—Immune plasma is more effective prophylactically than its globulin fraction. Serum treatment, after infection, is effective in reducing the lung lesions, especially if repeated doses are given. Neutral serum-virus mixtures are ineffective in producing active immunity. Repeated intranasal inoculations of formalized virus produce an active immunity, but concurrent intranasal inoculations of immune serum prevent the immunity from developing.

BEVERIDGE, W. I. B., STONE, J. D., & LIND, P. E. (1944). Suppression of antigenicity of influenza virus by admixture with homologous antiserum.—*Aust. J.*

exp. Biol. med. Sci. 22, 307-309. [Authors' summary copied verbatim.] 826

Treatment of formalized influenza virus A with an appropriate amount of homologous antiserum largely suppresses its capacity to produce antibody in rabbits or immunity in mice. Suppression of antigenicity by antibody *in vivo* is the probable explanation of the failure of vaccinated persons to respond to second inoculations of influenza virus.

HOYLE, L. (1945.) An analysis of the complement-fixation reaction in influenza.—*J. Hyg., Camb.* 44, 170-178. 827

When complement-fixation tests are undertaken with suitable preparations of influenza virus, using serial dilutions of antigen and serial dilutions of immune sera (method of Dean and Webb), points may be found giving the maximal serum titre and maximal and optimum antigen titres, all calculations being made on a 50% haemolysis-basis. The zone phenomenon may arise if excesses of antigen or of serum are used. The ratio of maximal to optimum antigen titre is of importance, since the maximal titre is easily found by a single titration with an excess of serum, whereas the estimation of the optimum titre is more complex. A prolonged period of fixation increases these titres but is counterbalanced by a loss in sensitivity to the test.

Methods are described for preparing soluble antigens by purification and concentration of filtrates with acetic acid at pH 5. The soluble preparations of all strains of influenza "A" virus studied were found to be identical, but were different from those obtained from "B" virus. The maximal serum titre was higher against fractions prepared from elementary bodies than against soluble antigens. The former appeared to be a complex of several different antigens and permitted some differentiation of various members of the "A" group: thus, tests with WS and swine strains gave some evidence of specific reactions. They were regarded, however, as of a quantitative rather than a qualitative nature.

From the practical point of view, soluble antigen is the more suitable for general diagnostic tests, since it will react with an "A" antiserum irrespective of the antigenic make-up of the infecting strain.

—R. E. GLOVER.

I. FRANCIS, T., Jr. (1945.) The development of the 1943 vaccination study of the commission on influenza.—*Amer. J. Hyg.* 42, 1-11. 828

II. RICKARD, E. R., THIGPEN, M., & CROWLEY, J. H. (1945.) Vaccination against influenza at the University of Minnesota.—*Ibid.* 12-20. 829

III. HALE, W. M., & MCKEE, A. P. (1945.) The value of influenza vaccination when done at the beginning of an epidemic.—*Ibid.* 21-27. 830

IV. EATON, M. D., & MEIKLEJOHN, G. (1945.) Vaccination against influenza: a study in California during the epidemic of 1943-44.—*Ibid.* 28-44. 831

V. HIRST, G. K., PLUMMER, N., & FRIEDEWALD, W. F. (1945.) Human immunity following vaccination with formalized influenza virus.—*Ibid.* 45-56. 832

VI. SALE, J. E., MENKE, W. J., Jr., & FRANCIS, T., Jr. (1945.) A clinical, epidemiological and immunological evaluation of vaccination against epidemic influenza.—*Ibid.* 57-93. 833

VII. MAGILL, T. P., PLUMMER, N., SMILLIE, W. G., & SUGG, J. Y. (1945.) An evaluation of vaccination against influenza.—*Ibid.* 94-105. 834

I. As a result of epidemiological studies, an outbreak of influenza was anticipated in the winter of 1942-43. A large batch of vaccine was therefore prepared from infected allantoic fluid and concentrated

ten-fold by absorption to and elution from chick red cells. The vaccine contained two strains of virus A, viz, PR.8 and Weiss, and the Lee strain of B virus. It was inactivated with formalin and preserved with phenylmercuric nitrate. No appreciable loss in antigenic activity was detected after 18 months at 4°C.

In the Autumn of 1943, six groups of service men, comprising a total of 12,500 in different parts of the U.S.A., were subjected to experiments. Complete clinical records were kept of upper respiratory infections and levels of serum antibody to virus A and virus B in both vaccinated and control persons.

II. In a test of the efficiency of vaccination, 599 people were vaccinated and 607 observed as controls. In the former, the antibody response to virus A was superior to that to virus B. Eleven days after vaccination, influenza broke out; the clinical attack rate was 2.7% in vaccinated and 9.06% in controls. There were no increases in serum antibody to B virus in the controls.

III. In further trials among students vaccination was carried out after the first case of influenza A had occurred; 599 were inoculated and an equal number left as controls. The incidence of clinical influenza was 4.48% in the vaccinated group, as compared with 8.18% in the controls.

Attempts were made to isolate the strain responsible by inoculating chick embryos and mice with unfiltered garglings, but both methods were relatively inefficient.

IV. In this study 457 were vaccinated and 435 served as controls. Influenza A broke out four weeks after vaccination was completed. Among the vaccinated, there were 51 cases suggestive of infection with influenza but only 18 yielded virus A; in the control group there were 53 cases with 26 positive to A. The total incidence was 3.92% in those vaccinated and 5.97% in the controls. In the authors' opinion it is doubtful if the difference is significant. It may be noted that the strain isolated in this outbreak showed some antigenic difference from PR.8. The effects of antigenic variations in the infecting strain of virus and of other factors are considered as possible causes for the inferior results of vaccination in California, as compared with those of other investigators using the same vaccine.

V. A mild epidemic occurred in a group of students, half of whom had been vaccinated. The incidence in the protected group was 77% lower than in an equal number of unvaccinated controls.

It is suggested that an increased general attack rate in a community would be accompanied by a smaller difference between vaccinated and normal persons. The desirability of restricting the preparation of influenza A vaccine to a single strain with a broad antigenic composition such as PR.8 is discussed. Since the particular vaccine used appeared to assert its protective effect within eight days of inoculation it would appear that vaccination can be carried out even when an epidemic has actually started.

VI. 886 service patients received the vaccine; there was an equal number of controls. The epidemic of influenza reached its peak four weeks after vaccination was completed. There was a lower incidence, 20 cases (2.27%) in the vaccinated group, as compared with 75 (8.58%) in the controls; in those vaccinated persons who were affected the disease was less severe. The effect of the dilution of controls with an equal number of vaccinated on the course of an epidemic is discussed.

Attention is drawn to an earlier conclusion of HIRST *et al.* [see V. B. 15, 186] that apparently there is a marked decline in the protective effect of vaccination by about the sixth week following an epidemic. The present authors suggest, however, that many unprotected persons exposed to infection may develop a symptomless

infection followed by the stimulation of natural immune bodies. As a result, groups of vaccinated and unvaccinated persons would tend to approximate to the same level as the epidemic progressed.

Studies of serum antibody after vaccination indicated that the protective effect of concentrated vaccine may be of longer duration than has been previously suspected. If such is the case, it might be easier to control influenza epidemics by revaccination at intervals shorter than the epidemic periodicity, than by the administration of vaccine in the face of an outbreak.

VII. In this series there were 1,474 vaccinated individuals and 1,461 controls. There were significantly fewer cases among the vaccinated than among the controls, 43 in the former as compared with 146 in the latter, a ratio of 1.0:2.3.

It is of interest that in studies of serum antibodies 26% of unvaccinated persons showed a significant rise against A, although only about a half gave a history of illness resembling influenza. It is likely, therefore that during an epidemic a fairly high proportion passed through a sub-clinical attack.—R. E. GLOVER.

BEVERIDGE, W. I. B. (1944.) Lack of increase in antibody after second injection of influenza virus in man.—*Aust. J. exp. Biol. med. Sci.* 22. 301-305. [Author's summary copied verbatim.] 835

Persons who have had one subcutaneous injection of formalized influenza virus mostly fail to get an increase in antibody as a result of a second similar injection given two weeks later. Even six months or perhaps a year after the first injection the increase following a second injection is less than in persons never previously vaccinated.

STANLEY, W. M. (1945.) The precipitation of purified concentrated influenza virus and vaccine on calcium phosphate.—*Science*. 101. 332-335. 836

The method of precipitation was by the addition of Na_2HPO_4 solution of buffer at pH 7.8 to the virus suspension, followed by the simultaneous addition of 1M CaCl_2 solution and 1M NaOH solution, drop by drop, with stirring. The precipitate was removed by centrifugation, the supernatant liquid being decanted through filter paper. 2 ml. of 1M CaCl_2 solution were required to precipitate about 95% of the chicken red cell agglutinating activity of 100 ml. of freshly harvested PR.8 influenza virus allantoic fluid. The washed precipitate consisted of about 10 mg. of virus protein, about 20 mg. of non-virus protein and about 200-300 mg. of $\text{Ca}_3(\text{PO}_4)_2$. This gives a virus- $\text{Ca}_3(\text{PO}_4)_2$ ratio of about 1:25 which cannot be decreased without loss of virus. Using purified and concentrated virus a precipitate could be obtained with a virus- $\text{Ca}_3(\text{PO}_4)_2$ ratio approaching 1:1 according to the initial concentration of virus. Approximately 5 ml. of 1M CaCl_2 solution per 100 ml. of virus suspension, irrespective of concentration of virus, were required to precipitate about 95% of the virus.—W. M. HENDERSON.

*COVER, M. S. (1943.) Studies on encephalitis.—*Thesis, Kansas*. pp. 38. 837

C. reviews the literature on all aspects of the subject, including history, properties of the virus, pathogenicity, means of transmission, and human infection.

The purpose of the work was to determine the incidence in Kansas of human infection with western E.E. virus. Thirty-six sera from clinical human encephalitis cases were tested by serum neutralization. Of these sera 41% contained neutralizing substances against the virus. It appeared to C. that the western strain of E.E. was involved in each case that was positive; the others probably were due to the St. Louis or poliomyelitis virus. Seven wood rats tested by serum

neutralization showed that they had not been exposed in the field and therefore were not carriers. Brain sections from g. pigs inoculated with triatoma viruses were shown microscopically to have undergone typical pathological changes.—H. L. GILMAN.

MOSZCZENSKI, Z., & KRUPSKI, A. (1943.) Beitrag zur histopathologischen Diagnose der Virus-Anämie. [Histopathological diagnosis of equine infectious anaemia.]—*Schweiz. Arch. Tierheilk.* 85. 365-370. 838

The authors examined histologically various internal organs of 64 horses at the medical clinic of Zurich Veterinary School. Changes which have been described [no references] as specific for E.I.A. were also found in many different disease conditions, including secondary anaemia, broncho-pneumonia, purpura and strangles. The authors consider therefore that the changes seen (lymphoid cell infiltration, presence of siderocytes and increase in the vesicular tissue of the liver) are merely signs of reticulo-endotheliosis of divers causation.—J. E.

— (1943.) Infektiöse Anämie des Pferdes. [Equine infectious anaemia.] (Speakers:—HORNÝACEK, HUBMAIR, & WALZ.)—*Berl. Münch. tierärztl. Wschr.* Wien. tierärztl. Mschr. April 2nd. 95-98. 839

HORNÝACEK reported that during 1932-42 a high proportion of the cases of E.I.A. in Germany had occurred in Silesia. He reviewed the position since 1921, when the disease became notifiable, and suggested that the slaughter policy provided the best method of control.

According to HUBMAIR, E.I.A. and paratyphoid infection are frequent complications of equine infectious bronchitis. In 1941 in Breslau, 300 cases of equine infectious bronchitis occurred out of 6,500 army horses; many of these were subsequently diagnosed as suffering from E.I.A. This diagnosis was based on the appearance of three characteristic signs, a porcelain-like colour of the conjunctiva, rapid and irregular heart action and unsteadiness of the hindquarters.

WALZ believed that the concentration of large numbers of horses in the army favoured the appearance of a mixed infection or disease complex consisting of equine infectious bronchitis, E.I.A., paratyphoid infection and leptospiral infection and discussed the differential diagnosis of these four diseases.—W. M. H.

GINDIN, A. P. (1940.) Patologicheskaya gistologiya selezenki i rol' poslednei v patogeneze pri infektsionnoi anemii loshadei. [Histopathology of the spleen and its role in the pathology of equine infectious anaemia.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 14-20. [French summary.] 840

In this work, G. describes the histopathological changes in the spleen of horses infected with E.I.A., basing his conclusions on observations made on some 500 naturally infected and 100 experimentally infected cases. Histological changes are evident in the spleen at all stages of the affection and are detailed as follows.

In acute cases, the chief characteristic is an abundance of red blood cells, many of which are granular and in the course of disintegration. They are frequently present in continuous masses, which restrict the splenic pulp to small islands around the trabeculae and blood vessels. The pulp consists chiefly of large rounded cells with small pale nuclei. The endothelial cells of the lymph vessels contain numerous fat droplets. Haemosiderin occurs in extremely small quantities.

In subacute cases, during or immediately following a febrile period, the endothelium of the blood vessels is hypertrophied and the individual cells appear swollen. Numerous erythrocytes are present, many showing signs

of disintegration. Erythrophages containing one or two r.b.c.'s are scattered throughout the pulp. Haemosiderin is only evident in very small amounts.

In early cases (2-3 months) after a fairly prolonged period of remission the blood content is insignificant. The follicles consist of almost single proliferative centres surrounded by narrow bands of small lymphocytes, which are surrounded in turn by concentric layers of elongated reticular cells. Quite large groups of eosinophiles occur between these cells and individual eosinophiles are found dispersed throughout the pulp. The endothelium of sinuses and vessels is markedly increased. In some cases there is an increase and thickening of the argyrophile fibres around the vessels and follicles.

During remission periods in chronic cases the general picture is similar to that found in early infections. The pulp is much infiltrated by cellular elements; these cells, sometimes rounded, sometimes branched, are rich in protoplasm and have well defined nuclei. Small groups of plasma cells may be present. The trabeculae are often strongly infiltrated by lymphoid cells and cells of a histiocytic nature. During febrile phases in chronic cases the sinuses are in places closely packed with erythrocytes. The most characteristic feature is the presence of numerous erythrophages containing up to ten or more erythrocytes. Lymphoid infiltration of the trabeculae is typical. Occasionally the reticular cells present evidence of degeneration. Haemosiderin is only found in small amounts.

It is concluded from this evidence that the spleen presents a series of characteristic changes which correspond closely to the successive clinical stages of the disease. Throughout the course of the infection the spleen appears to preserve its haemolytic function, but in the initial stages the lysis of r.b.c.'s is chiefly of extracellular occurrence. In the subacute and chronic phases, there is a marked proliferation of the reticulo-endothelial tissues and erythrophagia becomes a prominent feature as the disease becomes of longer standing. The biochemical processes, on the other hand, appear to have an altered character throughout the course of the disease. There is no evidence of increased haemosiderin production in the spleen at any stage, not even during periods of intensified haemolysis. G. considers that the release of abnormal breakdown products may play a contributory role in the pathogenesis of this disease and cites as an analogy the anaemia produced by parenteral introduction of albumins by SCHERMER & PENTIMALLI. The lymphoid elements progressively increase during the course of the disease.

Finally, in confirmation of the findings of NÖLLER, DOBBERSTEIN, AKULOV and others, G. states that the changes observed may ultimately undergo inverse development.—J. ALLAN CAMPBELL.

GAMALEYA, N. F. (1940). Eksperimental'nye issledovaniya infektsionnoi anemii loshadei. [Research on the virus of equine infectious anaemia.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 7-10. [French summary.] 841

After brief reference to the conflicting evidence from the work of GALLOWAY, OPPERMAN and others on the possibility of infection of small experimental animals with the virus of E.I.A., G. describes its transmission to rabbits. Using washed blood corpuscles from infected horses, he succeeded in establishing the disease in three series of rabbits, involving nine, 12, and 18 successive passages respectively. The results of the first series only are detailed and tabulated. The disease in rabbits is very mild and is characterized by a slight febrile reaction, together with a small reduction in the erythrocyte count. With the progressive rabbit

passages, the proportion of individuals exhibiting these symptoms rose from 63% to 90%. Material obtained after the ninth rabbit passage was infective and produced typical E.I.A. after inoculation into foals. Blood serum from infected rabbits was found upon injection into infected horses to reduce the fever and the possibility is discussed of using hyperimmune serum from goats as a therapeutic agent.

A vaccine containing virus and antibodies [presumably blood cells plus serum] was prepared from rabbits. This was successfully employed for the immunization of horses and conferred an immunity of at least five months' duration. The vaccine was considered safe, since 15 successive daily injections of 30 ml. did not disturb the health of foals, and although the details of dosing (quantity and conditions) could not yet be stated, it was considered that this vaccine would be useful in prophylaxis. Rabbit passage virus does not increase in virulence when injected into horses, but when these are already infected with the normal virus the typical E.I.A. symptoms develop. This property of the vaccine may be of practical importance in revealing the presence of virus carriers.

In discussing his findings, G. states that vaccination does not destroy the horse strain of the virus. He suggests that the immunity produced in horses by the rabbit strain may be a case of virus interference and he quotes an example in the work of THUNG (1931) on the antagonistic action between the "white mosaic" variant and the tobacco mosaic virus. [The interest of this paper would have been increased by a more complete presentation of the experimental data.]—J. A. C.

KUDRYASHOV, M. V., & TROITSKIĬ, I. A. (1940.) Primenenie fenomena retraktsii krovyanovo gushtka pri diagnostike infektsionnoi anemii loshadei. [The retraction of the blood clot as a test for equine infectious anaemia.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 21-22. [French summary.] 842

In this study special glass tubes were used, measuring 2 cm. in diameter by 13 cm. in length, and 20 ml. of blood from the jugular vein were placed in each. Two hours after collection, the blood was held at 37°-38°C. for a period of 22 hours and the serum was then removed and measured. In four healthy horses, the clots obtained were 1.5-3.0 ml. in volume, while in two cases of acute E.I.A. they measured 5.5-17.0 ml. In four cases of chronic E.I.A., the clot contracted as in normal blood and there was no significant difference from the normal. The phenomenon of irretractability was not, however, specific for acute E.I.A., since it occurred in blood of three horses infected with piroplasmiasis [presumably *Babesia caballi* infection], in three cases of surra and in three cases of dourine. All the animals were experimentally infected with the respective diseases. It is concluded that the phenomenon has no practical value in the diagnosis of E.I.A., except perhaps as an adjunct to the established methods.—J. A. C.

KULAKOV, G. E. (1940.) Sokhranayemost' virusa infektsionnoi anemii loshadei v krovi rogatogo skota. [Presence of virus of equine infectious anaemia in blood of ruminants.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 10-14. [French summary.] 843

While most authors agree that E.I.A. is not transmissible to ruminants, some cases have been recorded of a temperature reaction following inoculation in sheep and goats. The possibility has been stressed of an exacerbation in pure and cross-bred merino sheep of a latent infection of the specific anaemia of small ruminants [DONATIE & LESTOQUARD—*C. R. Acad. Sci., Paris.* 17. 203].

K. conducted cross-inoculation experiments and describes results in three two-year-old sheep, three

two-year-old bovines [eight bovines are mentioned in the French summary, but this figure does not agree with the text], and two lambs. The sheep received 50 ml., the bovines 100 ml., and the lambs 10 ml. each of infected blood. Inoculation was subcutaneous in some cases and intravenous in others. Eight yearling colts, and a nine-year-old horse were used for testing for the presence of virus. In all the ruminants the blood was non-virulent after 36 days. In a control test, 50 ml. of blood from the original source produced a typical E.I.A. syndrome in one of the young horses within 14 days of infection. A temperature reaction was noted in both lambs, which were of an unimproved local breed, but was not observed in any of the older animals. It is concluded that E.I.A. is not transmissible to ruminants and that the virus does not persist in them. They probably have no part in the epidemiology of the disease.—J. ALLAN CAMPBELL.

*LUTSCH, E. (1942.) Untersuchungen über das Vorkommen von histologischen Veränderungen der infektiösen Anämie in der Leber von Schlachtpferden aus Luxemburg. [Histological changes of infectious anaemia in the livers of slaughtered horses from Luxembourg.]—*Inaug. Diss., Hanover*. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* [Tierärztl. Rdsch. 51/49. 177-178.] 844

E.I.A. has not been established in Luxembourg since the first World War. The percentage of horses with haemosiderosis of the reticulo-endothelial cells of the liver is higher in Luxembourg and the E.I.A.-free districts of Cologne and Aachen than in regions where E.I.A. is prevalent, so that such haemosiderosis cannot be accepted as an indication of the disease.—E. COTCHIN.

SEMENOV, M. A., & KOZLOVA, E. S. (1940.) Deistvie temperatury na virus infektsionnoi anemii loshadei v syrovotkakh, konservirovannykh khinosolom. [Effect of temperature on the virus of equine infectious anaemia in sera preserved with chinisol.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 23-24. [French summary.] 545

Chinisol in the proportion of 1:5,000 was added to blood serum containing the virus of E.I.A. Three samples of the serum were heated over a water-bath for two hours, at temperatures of 56°, 58°, and 60°C. respectively. The virulence of the treated samples was tested by the subcutaneous inoculation of 50 ml. into foals. Altogether 13 foals, including four controls, were employed.

It was found that two hours' maintenance at 60°C. renders the virus non-infective. At 56°C. the virulence is conserved but considerably attenuated. At 58°C. the virulence appears to be destroyed, but a wider trial is required to verify this. The controls all developed the disease following inoculation with the original unheated serum.—J. ALLAN CAMPBELL.

SEMENOV, M. A., & KOZLOVA, E. S. (1940.) Deistvie dezinfitsiruyushchikh veshchestv na virus infektsionnoi anemii loshadei. [Action of disinfectants on the virus of equine infectious anaemia.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 24-26. [French summary.] 846

In view of the conflicting evidence from previous work on the action of disinfectants on the virus of E.I.A., the authors tested the destructive action of a series of chemical substances on the virus in blood and blood serum. The various agents were added in equal proportion to the infective material and the virulence in each case was tested by inoculation into two foals. The following results are given:—

With sodium hydroxide in 4% solution, the destruction of the virus was incomplete after 10 min. Complete inactivation followed after exposure for 15

min. and the virus was not reactivated after neutralization with sulphuric acid. The virus was not destroyed by a 4% solution of potassium permanganate after 15 min., nor by a 2% solution after exposure for 30 min. The virulence was destroyed after exposure to formalin (4%) for 5 min., but was restored within 15 min. in the presence of 2% ammonia. A 1:500 concentration of mercuric chloride destroyed the virulence within 30 min. The virus was non-infective after exposure for 15 min. to coal-tar creolin (10%). Creolin prepared from peat-tar distillates had no effect on the virus at the same concentration. Milk of lime (20%), calcium hypochlorite (5%), "nipozolnatrii" (0.8%) and chlorine gas (1:1,000 parts of air) had no destructive action on the virus.

On the basis of these findings, the authors suggest the use of 2% caustic soda, 5% coal-tar creolin, and 0.2% corrosive sublimate as disinfectants.—J. A. C.

BATTELLI, C. (1942.) Sulla depurazione in vitro con acaprin del sangue-virus pestoso contenente piroplasmii. [In vitro action of acaprin on piroplasms in rinderpest-virulent blood.]—*Boll. Soc. ital. Med. Ig. trop. (Sez. Eritrea), Asmara*. 1. No. 3. Reprint pp. 14. 847

In the plateau of Eritrea, blood-sucking vectors of piroplasmiasis are abundant and a high proportion of the cattle stock is infected, although clinical symptoms do not commonly occur. When calves used for the preparation of rinderpest virus are already infected with piroplasms, these frequently increase in numbers during the rinderpest reaction. Before this calf blood can be used as antigen in the preparation of hyperimmune rinderpest serum it is desirable that it should be free from infective piroplasms.

Acaprin (original Bayer solution) was added to the calf blood in the proportion 1:10,000 and the mixture was allowed to stand for 24 hours at air temperature (20°C.). The blood was then used in a dose of 2 ml. per calf for production of rinderpest virus and up to 4,000 ml. per adult for production of hyperimmune serum.

In a first series of experiments, ten samples of virulent rinderpest blood containing *Babesia bigemina* were treated with acaprin and administered variously to 87 calves and 30 adults. Nineteen calves reacted to rinderpest, the blood of five containing *B. bigemina*. Forty-eight calves were immune to rinderpest but nine of them developed a *B. bigemina* infection. *B. bigemina* was not recovered from any of the adults. In one of the ten samples of blood *Babesiella* [not specified] was present in the acaprin-treated inoculum, but failed to develop in any of five calves and one adult. As a control to these experiments, seven calves received virulent rinderpest blood containing *B. bigemina*, which had been allowed to stand for 24 hours without addition of acaprin. Six of these calves were resistant to rinderpest, but only one of them remained free of the piroplasm. Three calves developed a typical syndrome with icterus and haemoglobinuria. On the assumption that the virulence of the protozoan would be enhanced by passage, blood from one of these latter calves, which also reacted to the virus, was employed in a final control experiment in which five calves received acaprin-treated blood. All five remained free of piroplasms, but two developed rinderpest. A further five calves received blood from the same source without addition of acaprin and of these one developed rinderpest and piroplasmiasis with icterus; the remaining four did not react to the virus, but *Babesia* was recognized in the blood of three of them. The proportion of non-reactors to rinderpest among the calves was of the same order as that normally

encountered in the routine preparation of virus and in all those cases which failed to react to the acaprin-treated virus, a second injection of "normal" virulent blood did not elicit a reaction.

It is concluded that the treatment of blood with acaprin *in vitro* for 24 hours does not impair the virulence of rinderpest virus, while it renders piroplasms completely non-infective. B. considers that in those cases where *Babesia* was recognized after inoculation with acaprin-treated blood, the piroplasms developed from a latent previous infection and believes that the state of premunity in calves may be modified after infection with rinderpest virus. A discussion on the topic of premunity is included. It is considered that the technique described will have a practical value in the preparation of hyperimmune rinderpest serum.—J. A. C.

THOMAS, A. D., & REID, N. R. (1944.) Rinderpest in game. A description of an outbreak and an attempt at limiting its spread by means of a bush fence.—*Onderstepoort J. vet. Sci.* 20. 7-23. 848

The significance of game as a factor in the spread of rinderpest was emphasized in the 1938-41 outbreak in Tanganyika. Prior to 1938 it had been held that rinderpest epizootics in game died out rapidly with the rapid elimination of susceptibles. In the Lake Rukwa area there was evidence that the disease was becoming enzootic in game and that great game areas could become reservoirs of infection. This new state of affairs was associated with a "milder" type of the disease.

The history of rinderpest in the southern part of East Africa from the end of the 1914-18 war up to 1941 is briefly summarized. By 1935, the disease had been pushed gradually northwards until only two small outbreaks existed on the northern Tanganyika-Kenya border. This had been accomplished by stringent quarantine measures and inoculation with hyperimmune serum. During the financial depression of 1930-35, inoculation policy changed, the double-inoculation method replacing the use of hyperimmune serum. By 1938 the disease was again invading Southern Tanganyika. The spread was temporarily halted by immunizing with formalized tissue vaccine a belt of cattle south of the infection. Late in 1939 reports of game dying in the Saba Game Reserve and the Kilombero valley on the flanks of the immunized area were followed by the reappearance of the disease in cattle south of the vaccinated area. As a result, all cattle in the southern half of Tanganyika were immunized, using formalized tissue vaccine either alone or in combination with goat-adapted virus; in all over one and a half million inoculations were performed. It was assumed the disease was stamped out in cattle. In 1941, rinderpest reappeared in calves and game in the Saisi valley and the authors investigated the disease as it occurred in game in an area south east of the middle of Lake Tanganyika.

The seasonal changes in pasture, water supply and the grazing habits of the various types of game are described. A number of sick animals and an unusually large number of carcasses were seen. The carcasses included those of the buffalo, eland, kudu, topi, reed-buck and some which were not identified. Mortality seemed to be greatest in young game under three years of age. It is stated that many adult animals must have had the disease in a mild form and recovered. The symptoms, lesions and pathology of the disease in the buffalo, eland, and kudu are described. Skin lesions and profuse ocular discharge were features of the disease in all three species.

To confirm the diagnosis, game were shot and material collected and transported in thermos flasks to a temporary camp, where subinoculations were made

into calves and goats. In all, five such experiments were made, using material collected from two elands, four buffaloes and the fresh carcass of a kudu. One of the elands and one of the buffaloes showed symptoms. Difficulty was experienced in obtaining susceptible cattle for inoculation, as all bovines in the vicinity had been immunized in 1940. The results of the experiment may be briefly summarized as follows.

Material from the first affected eland caused a definite thermal reaction with ulceration of the mouth, diarrhoea and recovery in a calf. In each of two goats it caused a slight thermal rise on the fourth day. This result may be considered positive so far as the calf was concerned; it was tested after recovery with attenuated goat virus and proved to be immune. So far as the two goats are concerned the result was indefinite. One goat was killed by a leopard on the eighth day following inoculation. The other gave a marked thermal reaction when subsequently tested with attenuated goat virus. Neither the calf nor the two goats which were inoculated with material from the second affected eland reacted, but all three reacted strongly to a test dose of attenuated goat virus.

There were two experiments with buffalo material. In one, pooled material from three buffaloes, one of which showed symptoms and all of which had been shot, was inoculated into two goats. One goat had a thermal reaction and slight clinical symptoms from the third to sixth day and recovered; when subsequently tested with attenuated virus it gave no reaction. The other had a thermal reaction on the third day but was killed by a leopard on the sixth day before its immunity could be tested. In the second experiment material from a buffalo which did not show symptoms was inoculated into a calf and two goats, with completely negative results.

Material from the kudu produced a thermal reaction and slight mouth lesions in one calf. In another, there was no thermal reaction but typical clinical and P.M. lesions of rinderpest were found when it was slaughtered on the seventh day. No goats were inoculated with this material.

From these experiments the authors conclude that the disease in the game was rinderpest. They mention the possibility that the game were infected by contact with cattle reacting to inoculation with goat-attenuated virus, but dismiss this as "most unlikely" because "it can be assumed that the virus when returned to goats as in our experiments would have given rise to characteristic initial temperature rises. This was not the case".

In discussing the value of bush fences in limiting the movement of game they again raise the question of the origin of the outbreak saying that "Its origin has not satisfactorily been explained and the possibility of the virus being maintained in an unknown host must be borne in mind; alternatively there is the question of virus carriers in game or cattle".

[In view of the uncertainty as to the source of infection, the mild nature of the disease in adult game and the fact that attenuated goat virus had been used on a large scale for immunization of cattle, the possibility that attenuated goat virus may have been responsible is dismissed by the authors on evidence which is not very convincing. In the three experiments where transmission of rinderpest was proved, three calves and four goats were used (in one of these three experiments no goats were used). Two of the calves had thermal reactions, one of which was "fairly definite" and one "delayed". The third calf had no thermal reaction but showed typical lesions when it was slaughtered.

The thermal reaction of the goats are described as "slight on 4th day" in two cases "atypical on 3rd to

6th day" and "thermal on the 3rd day". Details of temperatures are not given and unfortunately two of the goats were killed by leopards before sufficient time had elapsed to determine the outcome of the infection.

In view of the difficulty in securing infection of the goat with the primary passage of bovine virus the fact that reaction was obtained in all four goats appears significant.

It is unfortunate that no material from the kudu carcass was inoculated into goats and that the conditions under which the work was carried out precluded further study of the virus in goats. Until the possibility of goat virus being involved is more definitely excluded it seems to be unnecessary to invoke the remote possibility of "virus carriers in game or cattle" or of a hypothetical "unknown host".—M. C.

ORR, W. (1945.) Observations on rinderpest in goats imported to Malays.—*J. comp. Path.* 55. 185-200. 849

Before 1939, Malaya had been free from rinderpest for some years and the import of cattle, sheep and goats from India was prohibited until war-time conditions made it necessary to bring large numbers of goats from India to meet military requirements. O. describes the outbreaks of rinderpest in 1941 in shipments from India of a total of 1,500 goats; deaths occurred during the voyage and infection was widespread on arrival in Malaya. In order to prevent further spread all three shipments were detained and later slaughtered at the port. Ample material was available from which to make a diagnosis and for the study of the symptoms and lesions, which are described in detail.

The diagnosis was confirmed by subinoculations into highly susceptible Bali cattle and Malayan goats, both of which species developed acute and rapidly fatal rinderpest.

The disease in the Indian goats was very acute and generally terminated in death 1-4 days after the first appearance of symptoms. The symptoms described are very similar to the classical symptoms seen in susceptible cattle. Mouth lesions were present but in many cases death occurred before they had progressed to the stage of ulceration. Copious nasal discharge and conjunctivitis with lachrymation and in many cases oedematous swelling of the eyelids were features of the syndrome. Diarrhoea was severe with passage of fluid, dark-coloured, offensive-smelling faeces containing blood. Severe pain evidenced by arching of the back, grinding the teeth, grunting, etc., was characteristic. The most severe and constant lesions were in the alimentary tract and to a lesser extent in the gall bladder. Pulmonary lesions occurred but were variable and inconstant and probably due to intercurrent infections. In many carcasses there were no significant pulmonary lesions. The intestinal lesions described resemble closely those found in affected cattle. The ileo-caecal valve was a constant site of acute haemorrhagic inflammation.

These findings are compared with those described by WHITWORTH & ROCKER (1936) in Indian goats imported to Singapore in 1935. In the 1935 outbreaks the symptoms and lesions were similar but the disease did not run such an acute course. Contact and sub-inoculation experiments with local cattle, buffaloes and goats gave indefinite results. The disease was transmitted to goats both by contact and by inoculation with blood, while in susceptible cattle it caused a mild illness with fever, diarrhoea, congestion and erosion of the buccal and nasal mucosa, but no mortality. [The course of the disease resembled that seen in cattle following vaccination with goat-adapted rinderpest virus.]

These outbreaks indicate that goats may be important agents in the spread of the disease.—M. C.

I. FLEURY, P. (1943.) A propos du coryza gangréneux des bovidés. [Bovine malignant catarrh.]—*Schweiz. Arch. Tierheilk.* 85. 125-128. [In French.] 850

II. WYSSMANN, E. (1943.) Böartiges Katarrhalfeieber. [Bovine malignant catarrh.]—*Ibid.* 225-234. 851

I. F. relates his experience of bovine malignant catarrh over many years in western Switzerland. He believes that the disease is brought on by sudden meteorological changes, notably severe thunderstorms. Under the prevailing livestock insurance arrangements the slaughter of affected animals is to be recommended.

II. This is a systematic summary of present-day knowledge of the disease. The original should be consulted.—J. E.

WOOD, F. W., CASSELBERRY, N. H., & WALKER, W. W. (1945.) Results of experiments to determine duration of immunity against hog cholera induced by BTW (Boynton's tissue vaccine).—*N. Amer. Vet.* 26. 532-534. 852

Two groups of 21 pigs from a known highly susceptible strain were vaccinated with two types of Boynton's tissue vaccine. No control group was included. The infective dose was 5 ml. swine fever virus of standardized virulence.

The authors found that a solid immunity to swine fever could be maintained for six months; this immunity showed some evidence of break-down at nine months.—W. R. KERR.

I. KIUR-MURATOV, A. P. (1940.) Epizooticheskiĭ entsefalez litsits. [Epizootic "encephalosis" of foxes.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 102-103. [French summary.] 853

II. KIUR-MURATOV, A. P. (1940.) Virusonositel'stvo pri entsefaleze litsits. [Carriers of the virus of "encephalosis" of foxes.]—*Ibid.* 103-104. 854

I. The author records experimental studies on a disease of foxes resembling the encephalitis described by GREEN [see *V.B.* 11. 226] and which he terms "epizootic encephalosis". Two distinct clinical types occur, one of the central nervous system with psychic and motor disturbances, the other gastro-intestinal; some cases occur with mixed symptoms. Occasionally the symptoms may simulate rabies. The disease, a very variable entity, may run an acute or chronic course and may be complicated by secondary symptoms such as conjunctivitis, keratitis, blindness, purulent dermatitis, rhinitis, etc. The causal agent is a filterable virus. Experimental induction of the disease has been achieved in foxes, ferrets, puppies and g. pigs by occipital, intracerebral, ocular, intradermal, intramuscular and oral administration and the virus is recoverable principally from the central nervous tissue. The most characteristic lesion is haemorrhage into the wall and lumen of the stomach and this may extend to the intestines. Recovery confers a labile immunity, the animals remaining virus carriers for long periods. The problem of virus carriers is an important factor in the spread of infection and their removal is advisable. The reproductive index in packs containing virus carriers may be 12-19% less than in healthy packs. Vaccination with a formalized vaccine conferred some degree of benefit and in one experiment the case incidence was reduced by 22% as against unvaccinated controls. The actual figures are not given, but the 32% given in the French summary is a misprint.

II. This note is a brief extension of the previous paper and deals with the problem of virus carriers. The presence of virus in animals which have recovered

from clinical symptoms and occasionally in animals which are subjects of an occult infection is a potential danger to the other animals in the pack. The advisability of their removal is stressed. In packs where this procedure was adopted, there was a marked fall in the incidence of the disease; one case is recorded in which the incidence fell from 20% to less than 1%.

—J. ALLAN CAMPBELL.

I. KIUR-MURATOV, A. P. (1940.) Ob immunologicheskikh svoistvakh virusa chumy sobak. [Immunological properties of dog distemper virus.]—*Trud. vsesoyuz. Inst. eksp. Vet.* 15. 104. [French summary.] 855

II. KIUR-MURATOV, A. P., & RYABTSEV. (1940.) Opyt protivochumnykh privivok u sobak. [Vaccination of dogs against distemper.]—*Ibid.* 104–105. [French summary.] 856

I. In a natural outbreak of dog distemper observed by the author, the disease took an atypical form, characterized by transitory keratitis, an irregular temperature response and a benign course. The diagnosis was confirmed by experimental infection of puppies. After recovery from this infection, experimental infection with a new strain of virus produced distemper which was fatal in some cases. The author concludes that this is evidence of the immunological heterogeneity of the distemper virus and probably accounts for the variability in the clinical course of the disease.

II. Non-homogeneity of the virus may be one of the causes of the divergence of results after immunization against dog distemper. Taking account of this, the authors immunized a number of dogs by the Laidlaw-Dunkin method and reduced the mortality in a natural outbreak of the disease from 48% in untreated to 9% in immunized animals.—J. ALLAN CAMPBELL.

BRAGA, A. (1942.) Sobre a aferição do imune-sôro contra a doença de Carré. [Titration of immune serum for use in dog distemper.]—*Bol. Inst. Vital Brasil.* No. 24, pp. 5–26. [French summary.] 857

B. investigated the titration of homologous dog distemper-immune serum by means of the complement-fixation test. He found that the best antigen is provided by a 20% alcoholic extract of infected spleen, diluted before use in an equal amount of physiological saline, 0.2 ml. of this extract being titrated against falling dilutions of the serum under test. A serum which fixes complement in a dose of 0.001 ml. is judged sufficiently active to be used as a hyperimmune serum.

B. summarizes the requirements of a virus suitable for serum production. It should have an incubation period of about four days, causes a rise of temperature of inoculated dogs to about 41°C. between the fourth and seventh days, and it should reproduce constantly the clinical and morbid anatomical features of the disease. It should kill experimental dogs within 20 days.

The production of serum and its filtration, purification and concentration are discussed. [B. does not believe that concentration of this hyperimmune serum is justified.]—I. W. BROCKLEHURST.

KIRK, R. J., & COLLINS, H. C. (1945.) Occurrence of leucopenia preceding visual clinical symptoms in ferret distemper.—*Canad. J. comp. Med.* 9. 123–125. 858

Preliminary studies on the white blood cell count of infective ferrets indicate that there is a leucopenia associated with a rise in temperature occurring prior to the appearance of visible distemper symptoms. The average leucocyte count in 18 distemper cases was 4,972, whereas the average count in 17 non-infected or normal ferrets was 10,891.—P. J. G. PLUMMER.

GORDON, F. B. (1945.) The neutralization of poliomyelitis virus by dog serums.—*J. infect. Dis.* 76. 198–202. 859

In an examination of 37 dog sera for neutralizing ability against mouse-adapted poliomyelitis virus (Lansing), three sera were found which neutralized the virus. The dogs used in this survey were strays collected in Chicago during the winter 1943–44 and although it was assumed that they had been in the city during the 1943 poliomyelitis season there was no evidence that the neutralizing power of the serum was due to previous contact with poliomyelitis virus. Two of the positive sera failed to neutralize St. Louis encephalitis virus. No neutralization was obtained with sera of two chickens and six pigeons from the immediate vicinity of a case of poliomyelitis.—W. M. HENDERSON.

MELNICK, J. L., HORSTMANN, D. M., & WARD, R. (1945.) Intraspinal inoculation of infective human stools as a method of producing poliomyelitis in the monkey.—*J. infect. Dis.* 77. 13–15. 860

Direct inoculation of the spinal cord of rhesus monkeys in the region of the lumbar enlargement was compared with the orthodox intracerebral route for testing human faeces for poliomyelitis virus. The disadvantages of lowered sensitivity to virus infection and a high percentage of cord injuries when the lumbar route was used outweighed the possible advantages of a shorter incubation period and less necessity for purification of the material before inoculation.—W. M. H.

WALKER, D. W. (1945.) Some epidemiological aspects of infectious hepatitis in the U.S. Army.—*Amer. J. trop. Med.* 25. 75–82. 861

W. gives a brief description, well illustrated by graphs, of certain epidemiological aspects of outbreaks of homologous serum jaundice and naturally occurring infectious hepatitis in the U.S. Army in 1942–43. Early in 1942 outbreaks of jaundice occurred in the U.S.A., Hawaii, the S.W. Pacific, Alaska, Iceland and England; all these outbreaks were associated with the administration 2–3 months previously of certain lots of serum-containing yellow fever vaccine. A total of 51,337 cases were reported. No further cases were associated with yellow fever vaccination following the substitution of a serum-free vaccine.

During the late summer and autumn of 1943 an epidemic of infectious hepatitis occurred in North Africa. There was an apparent restriction of the disease to certain insect-ridden areas and the incidence curve was similar to that of malaria and of sandfly fever but occurred three months later. There was no apparent relationship to cases of respiratory disease but there appeared to be an association with conditions leading to a high rate of dysentery. It had been thought that the spread of the disease was respiratory in nature, but in view of features of this epidemic it is noted that more emphasis should be placed on sanitation and insect control. [See also *V. B.* 14. 10.]—W. M. HENDERSON.

ESSEN, K. W., & LEMBKE, A. (1944.) Zur Aetiologie der Hepatitis epidemica. [The aetiology of infective hepatitis.]—*Med. Z.* 1. 99–100. [Abst. in *Bull. War. Med.* 6. 143–144, copied verbatim. Signed: F. O. MACCALLUM.] 862

The authors state that they have demonstrated by means of the electron microscope that the virus of infective hepatitis is a compact polyhedral elementary body with a diameter of 180 mμ. The elementary bodies were always found in the chorio-allantoic membrane of chick embryos which died following the inoculation of bacteria-free filtrates of blood and duodenal washings of hepatitis patients. Similar results

were obtained with material from sporadic cases and from those occurring in an epidemic.

Seven human subjects were given intravenous injections of a virus suspension which had been through several passages in chick embryo. Certain of the subjects were starved for several days before the inoculation. None of the seven developed jaundice, but all are said to have developed typical clinical symptoms and signs, and in one man the serum bilirubin rose to 1.8 mgm. per cent.

Material from two cases of salvarsan jaundice also produced the positive changes in the chick embryo.

[The various German claims of successful laboratory transmission of infective hepatitis have not been confirmed by Allied workers.]

HELWIG, F. C., & SCHMIDT, E. C. H. (1945.) A filter-passing agent producing interstitial myocarditis in anthropoid apes and small animals.—*Science*. 102. 31-33. 863

A Berkefeld and Seitz filter-passing agent obtained from the pleural fluid and the spleen of a chimpanzee that had died from acute cardiac failure and acute pulmonary oedema produced myocarditis with regularity in mice, g. pigs and rabbits. The lesions in the heart muscle ranged from small foci of myocardial necrosis and interstitial leucocytic infiltration to extensive and widespread areas of necrosis and inflammation.

—W. M. HENDERSON.

BUCKLAND, F. E., MACCALLUM, F. O., DUDGEON, A., NIVEN, J. S. F., EDWARD, D. G. ff., ROWLANDS, I. W., HENDERSON-BEGG, A., VAN DEN ENDE, M., BARGMANN, H. E., CURTIS, E. E., & SHEPHERD, M. A. (1945.) Scrub-typhus vaccine: large-scale production.—*Lancet*. 249. 734-737. 864

A description is given of the large-scale production of scrub typhus vaccine from a strain of *Rickettsia tsutsugamushi* maintained by intranasal passage in mice and passage into cotton-rats for the manufacture of the formalized lung vaccine. 15,100 mice were used, of which 9,163 died or were discarded as unsuitable; of 16,882 cotton-rats, about 20% were discarded or died before the fourth day. Three cases of accidental infection occurred amongst the 60 workers, but all three had received courses of immunizing injections and made uneventful recoveries.

Research on the serial passage of the rickettsia in the yolk sacs of chick embryos revealed that the yolk sacs might be infective at dilutions of 10^{-6} or 10^{-7} in spite of the apparent absence of rickettsia: their invisibility might be the result of inefficient staining. Filtration experiments showed that emulsions became non-infective after passing gradocol membranes with 0.5 μ pores. Intratracheal injections of the lung-adapted strain into sheep and goats caused massive pulmonary infections, but very few rickettsia could be found, and serial passage was unsuccessful.—U. F. RICHARDSON.

FULTON, F., & JOYNER, L. (1945.) Cultivation of

Rickettsia tsutsugamushi in lungs of rodents. Preparation of a scrub-typhus vaccine.—*Lancet*. 249. 729-733. 865

On the first intranasal administration of a strain of *R. tsutsugamushi* derived from the peritoneal exudate of an inoculated mouse, the lungs of experimental mice killed on the seventh day appeared normal, but a few mononuclear cells contained clusters of rickettsiae. By the fifth intranasal passage there was a great increase in rickettsiae and the mice died, with total consolidation of the lungs on the fifth or sixth day.

The rickettsiae became very small and difficult to identify and none of the recognized stains were satisfactory. The best results were given by Ziehl-Neelsen carbolfuchsin followed by thionin-azur II, but a contrast stain for rickettsia is badly needed.

The lung-adapted strain developed gross bacterial contamination, but this was overcome by giving the inoculated mice sulphathiazole every second day.

Cotton rats and hamsters also proved highly susceptible, the rickettsiae being larger in them and more easily identifiable.

The identity of the strain was proved by complement-fixation tests, intraperitoneal inoculation into mice and by the fact that one human case of tsutsugamushi disease developed as a result of the bite of an inoculated animal.

Formolized lung vaccine prepared from the lungs of cotton rats gave distinct protection to mice against the intraperitoneal injection of another strain of *R. tsutsugamushi*.—U. F. RICHARDSON.

DING, E. (1943.) Über die Schutzwirkung verschiedener Fleckfieberimpfstoffe beim Menschen und den Fleckfieberverlauf nach Schutzimpfung. [Protective action of different exanthematic typhus vaccines.]—*Z. Hyg. InfektKr.* 124. 670-682. 866

A comparison is made of the response to naturally acquired typhus of approximately numerically equal groups of men protected against the disease by various standard vaccines and two unprotected groups. Only those men are included, the date of whose infection was known. The vaccines were made from the intestines of lice infected with *Rickettsia prowazeki*, yolk sac cultures of *R. prowazeki*, yolk sac cultures of mixed strains of *R. prowazeki* and *R. mooseri*, rabbit lung infected with *R. prowazeki* and dog lung infected with the same organism. To estimate the response to infection records are given of the incubation periods, the period of fever, the blood pressure, temperature and pulse rate, leucocytic count, duration of symptoms, loss of weight and mortality.

In vaccinated persons the incubation period was lengthened, the period of fever reduced and the mortality was almost negligible, but vaccination did not affect the infection rate. All the vaccines appeared to be effective but two deaths occurred in the groups inoculated with mixed strains of *R. prowazeki* and *R. mooseri*.—U. F. R.

See also absts. 874 (vaccinia), 886 (feline distemper), 894 (equine respiratory viruses), 900 (rinderpest).

IMMUNITY

PETHERICK, M. H., & SINGER, E. (1944.) Detoxication of diphtheria toxin.—*Aust. J. exp. Biol. med. Sci.* 22. 285-289. [Authors' summary copied verbatim.] 867

The detoxication of purified diphtheria toxin by iron or copper and ascorbic acid has been investigated. Iron and neutralized ascorbic acid together produced detoxication but no change in combining power. Incubation with copper and neutralized ascorbic acid

led to complete destruction of toxin. Formol toxoid was unaffected by a copper-ascorbic acid mixture sufficient to destroy equivalent amounts of unaltered toxin.

BOUSFIELD, G. (1945.) Restoration of diphtheria immunity without injections. Toxoid pastilles by mouth.—*Brit. med. J.* June 16th. 833-835. 868

B. explored the possibility of re-immunizing against diphtheria by introducing into the system a

formol toxoid antigen in the form of gelatin pastilles taken orally. Each pastille contained an equivalent to 100 Lf units and the toxoid was of 75% purity.

The method seemed to be generally effective in subjects who had some degree of antitoxin present in the blood before sucking the pastilles, but there was no evidence that a primary immunization could be gained by this method. The absorption of the toxoid was found to take place only in the upper part of the alimentary tract.

B. suggests that this method of immunity boosting should be explored in the case of other antigens, e.g., those of tetanus.—W. R. KERR.

ROSENOW, E. C. (1945.) Production in vitro of substances resembling antibodies from bacteria.—*J. infect. Dis.* 76. 163-178. 869

R. reports the preparation of non-toxic and non-sensitizing antibodies from a variety of organisms by causing their disintegration by prolonged heat. The main experiments were undertaken with streptococci, but pneumococci, staphylococci and a variety of Gram-negative organisms behaved in a similar manner.

Dense suspensions preserved in glycerol-saline were autoclaved at different pH reactions for 2-144 hours. The appearance of specific antibodies was detected by agglutination and precipitation tests using suspensions of organisms as antigen and the heated supernatant fluids as antibodies. The best results in the case of alpha streptococci were obtained when the organisms were heated for 48 hours at 17 lb. in N/20 HCl and were not neutralized after heating. Within limits, the amount of aggl. obtained was roughly proportional to the duration of intensity of the heat and to the pH selected. Various subsidiary experiments are described on the effect of adding foreign protein, the action of oxidizing agents, of which hydrogen peroxide had a marked enhancing action on the appearance of antibodies, and the stability of the solution after storage at low temperature.

As high end-points were noted in aggl. tests (up to 1:31,250) and the results were specific at the extreme end of the range, it is considered that the agglutinins were produced from the bacteria and were not freed in the form of auto-antibodies.

The replacement of immune sera by agglutinins produced in vitro in conducting diagnostic tests, is discussed.—R. E. GLOVER.

BOQUET, A. (1943.) "Substances antihistamiques" et réactions tuberculiques. ["Anti-histamine" substances and the tuberculin test.]-*Ann. Inst. Pasteur.* 69. 55-58. 870

On the assumption that injection of tuberculin in the tuberculous subject results in the liberation of histamine, B. investigated the influence of synthetic anti-histamine compounds on the reaction to intradermal and subcutaneous tuberculin in both normal and tuberculous g. pigs. The compounds tested were 3-diethylaminoethylbenzodioxan (883F), thymoxethyl-diethylamine (929F), and the chlorhydrate of N-dimethylaminoethyl-N-benzylamine (2339RP). Subcutaneous administration of these substances (10-25 mg.) before, simultaneously with, and after the subcutaneous and intradermal injection of tuberculin did not in any way influence the general toxicity or local reaction to the latter. Despite this negative result, B. feels that the tuberculin reaction is accompanied by liberation of active toxic substances.—ALEX. B. PATERSON.

KLEEGER, J. (1945.) Studies on the Weltmann reaction in malaria cases.—*Trans. R. Soc. trop. Med. Hyg.* 39. 221-228. 871

K. employed the Weltmann coagulation reaction in 25 cases of malaria in human beings. The coagulation

band is usually shortened in acute infections with high fever. In malaria, which produces clinical evidence of an acute inflammatory process, the coagulation band is either prolonged, as shown in 13 cases, or remains normal, as seen in ten cases. The Weltmann test is a specific protein-globulin reaction but K. produces evidence that in tropical countries it assists in the diagnosis of acute fevers. He suggests that haemolysis may account for the more prolonged coagulation band in malaria. There is a possibility that the Weltmann test may be of value in other tropical diseases.—C. H. S.

COHEN, S. S. (1945.) The chemical alteration of a bacterial surface, with special reference to the agglutination of *B. proteus* OX-19.—*J. exp. Med.* 82. 133-142. 872

Suspensions of *Proteus vulgaris* were treated with benzene sulphonyl chloride at 4°C. The benzene sulphonyl chloride reacted with the imidazole groups of the surface and changed the electrophoretic behaviour of the organisms without changing their power to combine with the homologous specific antibody. The treatment modified the agglutination reactions of the bacteria so that suspensions were more readily agglutinated.

—E. BOYLAND.

DAMMIN, G. J., & WELLER, T. H. (1945.) Heterophile agglutinins and cold autohaemagglutinins in schistosomiasis, filariasis, malaria, and leprosy.—*Amer. J. trop. Med.* 25. 97-102. 873

The authors examined the plasma of 123 cases of schistosomiasis, 104 cases of filariasis, 40 untreated cases of malaria and 18 cases of leprosy in human beings for the presence of antibodies which would agglutinate sheep erythrocytes and for cold autohaemagglutinins. They also examined as controls 273 samples of Kahn-positive human sera and the sera of six rabbits artificially infected with *Schistosoma mansoni* for the presence of the sheep cell agglutinins. Their results indicate that heterophile agglutinin and cold autohaemagglutinin antibody titres of significance were encountered infrequently in schistosomiasis, filariasis and malaria, and not at all in the artificially infected rabbits; in four of 18 specimens of plasma from lepers, however, a heterophile agglutinin titre of 1:128 was obtained. The authors observe that after storage at 5°C. for 21 days the titre of the leprosy plasma fell considerably.—J. F. A. SPRENT.

*GASTINEL, P. (1942.) Sur la signification des phénomènes de l'allergie vaccinale. [Phenomena of allergy in vaccination.]-*Rev. Path. comp.* 42. 302-305. [Abst. from abst. in *Bull. Inst. Pasteur.* 42. 90-91.] 874

Vaccination allergy, seen after revaccination, is accompanied by, but independent of, immunity and is an indication of sensitization due to the presence of a specific antibody in the blood serum of the vaccinated subject.

The serum of an allergic vaccinated subject, mixed with complement and vaccine, provokes on intradermal inoculation into a new subject a local papular infiltrative reaction (Brokman phenomenon). This reaction may be considered to be due to a toxic substance formed by the union of the sensitizing antibody and vaccinia. Injection of rabbits with killed vaccinia causes the development of neutralizing power and also the power of provoking the Brokman phenomenon, but the animals remain receptive to live vaccine. Allergic reactions can be obtained in a vaccinated subject with killed virus and desensitization by the usual method used in cases of protein allergy is possible.—E. COTCHIN.

HEISE, H. A. (1945.) The mechanism of desensitization in allergy.—*Amer. J. clin. Path.* 15. 77-81. 875

H. explains the phenomenon of allergy in terms of

classical antigen-antibody reactions, but criticizes the theory which explains desensitization as the neutralization of antibodies by the injection of small quantities of antigen. Although this type of desensitization occurs for a short time following recovery from anaphylactic shock, the object in treatment of allergic conditions in man involves production of immunity at the site of injection without stimulating the tissues it is desired to protect. As the injected tissues produce fixed

cellular antibodies and the immunity produced approaches that in the original shock organ, the latter is increasingly spared the unfavourable antigen-antibody reaction. The ultimate object is humoral immunity with insulation of all shock organs, preceded by the shifting of the shock organ to one more capable of withstanding the reaction. The importance of site of injection and minimal dosage of antigen is stressed, and several human case histories are described.—A. B. P.

See also absts. 773, 774 (TB. allergy and immunity), 788 (pullorum disease antigens), 889 (serodiagnosis of trichinosis), 791 (tube aggl. test for brucella), 827 (c.-f. test in influenza), 801 (serological varieties of *Trichomonas foetus*), 821 (immunological unity of vaccinia strains), 819 (dry vaccine for variola), 816 (Waldmann vaccine for F. & M. disease), 864, 865 (vaccines for scrub typhus), 866 (for exanthematic typhus), 792 (tetanus sero-anatoxotherapy), 822 (swine influenza antibody response), 777 (immunization against Johne's disease), 828-835 (against influenza), 855-857 (against dog distemper), 852 (against swine fever).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

— (1945.) The scientific basis of the control of *Glossina morsitans* by game destruction, by the Trypanosomiasis Committee of Southern Rhodesia. —*Rhod. agric. J.* 42. 124-128. 876

The policy of creating and maintaining game-free zones has been operative in some areas of Southern Rhodesia for 25 years and doubt no longer exists that sustained selective hunting will lead to the disappearance of *G. morsitans* within the next ten years. Owing to the kind of animals on which *G. pallidipes* feeds and the type of country it inhabits, hunting is of value in control of this species only when combined with clearing.

Tsetse flies depend on blood both for their food and water requirements and flies at large feed on those species of game which are regularly available to them, in the case of *G. morsitans* on large mammals and in the case of *G. pallidipes* on bushbuck and bush pig. Other occasional hosts may be used but when regular hosts are scarce the flies lose too much moisture in seeking food, and the mortality rate rises, with ultimate complete eradication.

The survival of *G. morsitans* requires the presence of dependable hosts and the dependability is governed by the local habits of the animal, e.g., in some areas elephants are not dependable, as they migrate, whilst in others there are always a certain number present.

The haunts of *G. morsitans* are permanent to the extent that the regular hosts are present and if the flies are eliminated from such permanent haunts they cannot survive throughout the vastly larger areas where game is scattered and seasonal in distribution.

It has also been shown that where the shot-out zone has its ends in fly-free country, if the hunters are moved systematically into the fly belt as this recedes, game can be allowed to flow back into the liberated area without danger of re-introducing tsetse.

It is claimed that in spite of hunting measures it cannot be shown that any species of animal has been brought within measurable distance of extermination in the colony and it is pointed out that in agricultural areas, game animals damage crops and in pastoral areas increase the difficulties of controlling stock diseases.

—U. F. RICHARDSON.

*SCHMIDT, H. W. (1942.) Sarkoptes-Räude bei Füchsen, Hunden und Menschen. [Sarcoptic mange in foxes, dogs and man.]—*Z. Hyg. Zool.* 34. 141-146. [Abst. from abst. in *Jber. Vet.-Med.* 70. 554.] 877

From the German abstract, this article does not appear to add anything to the two previously published by S. on the same subject [see *V. B.* 12. 455].—J. B. C.

See also absts. 782 (vector of tularaemia), 986 (feeding insects in the laboratory), 1006 (*Bovicola ovis*, sheep blowfly, *Psorergates ovis*, chorioptic mange in Australia).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CAMERON, T. W. M. (1945.) Fish-carried parasites in Canada.—*Canad. J. comp. Med.* 9. 245-254, 283-286 & 302-311. 878

Canada has about one-eighth of a million square miles of fresh water with a large and extremely valuable population of commercial and game fish. Some of these harbour larval flat-worms of great interest and at least of potential importance to both human and veterinary medicine.

The heterophyid trematodes show a very low degree of host specificity. In the few life-cycles so far worked out, two intermediate hosts, snail and fish, are essential. Recent work by AFRICA *et al.* in the Philippines has shown the potential danger of entry of heterophyid eggs into the circulation with production of fatal cardiac emboli. *Apothallus venustus* is described. The only species of local snail found to carry this trematode was *Goniobasis livescens*. In Canada *A. venustus* has been found in cats, dogs, raccoons (*Procyon lotor*), and in the great blue heron (*Ardea herodias herodias*). On one occasion eggs agreeing in appearance with those of this species were found in a human stool. *A. brevis* has

been recovered from young loons (*Gavia immer*) in Quebec. The life-cycle, while similar to that of *A. venustus*, differs in detail and is described.

Metorchis conjunctus is distributed over an area of about 750,000 square miles. It is found naturally in man, dog, red fox, mink, raccoon, and cat, and experimentally also in silver fox and ferret. It has not been found in birds. *Clinostomum marginatum* is a common trematode encysted in fish and might be able to live at least for a time in man or other mammals.

The species of the cestode genus *Diphyllobothrium* are very imperfectly known. *D. latum* is the most common tapeworm in man in Eastern Canada. It is not definitely known whether the American *D. latum* is the same as the European species. Other genera of tapeworms are discussed.

Only one of the trematodes carried by salt-water fish is of importance in Eastern Canada. This is *Cryptocotyle lingua*, which lives in the small intestine of fish-eating birds and mammals. It has not been reported in man. The snail vector is *Littorina littorea*. Larval ascarids belonging to the genera *Anisakis* and

Porrocaecium are common in the musculature of a variety of bottom-feeding fish. None, however, will develop in man or domestic animals, but as they are large the fish containing them is unacceptable for food. Thousands of dollars are spent in inspecting fish fillets and removing infected ones from sale.—R. GWATKIN.

BAKULEVA, N. A. (1941.) Diagnostika i terapiya anoplotsefalidovzov loshadei. [Diagnosis and therapy of anoplocephalid infestation in horses.]—*Trud. XV Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [Diseases of Horses.] pp. 185-191. 879

B. examined P.M. 292 horses in Kharkov and Stalingrad provinces, and found 163 (55.8%) infested with tapeworms.

Anoplocephala perfoliata was found in 100 horses, *Paranoplocephala mamillana* in 92, and *A. magna* in 23; 7% of the horses were infested with all three species simultaneously, 23% with two and 25.8% with one species only. The number of parasites in each horse varied from 1-800.

P. mamillana was mainly found in the duodenum and only occasionally in other parts of the intestines; *A. magna* occurred in the middle region of the small intestine, and *A. perfoliata* as a rule in the caecum and also, in cases of heavy infestation, in the caudal part of the small intestine.

B. describes with diagrams the characteristics of the eggs of these species, thus enabling differentiation and accurate diagnosis *intra vitam*.

Among various anthelmintics used, filix mas was found most reliable; arecolin and copper sulphate were unsatisfactory.—A. MOLDAWSKY.

ROTH, H. (1945.) Serodiagnosis of trichinosis by microscopical testing with living *Trichina* larvae. [Correspondence.]—*Nature, Lond.* 155. 758-759. 880

R. draws attention to the occasional failure of the intradermal and precipitin tests to diagnose mild *T. spiralis* infection in man and reports on the successful diagnostic use of the reaction between *Trichinella* larvae and immune serum [see MAUSS—V. B. 12. 38, III, and OLIVER-GONZALEZ—V. B. 11. 775] in a series of human cases in Sweden. He also obtained satisfactory results with infected pigs, dogs, cats, silver foxes, rabbits and g. pigs. He placed 100 larvae, washed and freed from their cysts by artificial digestion, in a hollow-ground slide with 0.5 ml. of centrifuged serum. A coverslip was applied and precautions were taken to prevent desiccation. The slides were examined after five and 24 hours. In positive sera, precipitates are visible at the anterior ends of the larvae after five hours.

See also absts. 873 (schistosomiasis, filariasis), 962 (effect of sulphonamides on nematode larvae), 910 (haemonchosis), 963, 1010 (trichinosis), 1006 (anthelmintics).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

SCHINZ, H. R. (1942.) Der Metalkrebs. Ein neues Prinzip der Krebszeugung. ["Metal cancer"].—*Schweiz. med. Wschr.* 72. 1070-1074. 883

In 1934-36, metal depots of 0.1-0.15 g. of cobalt, arsenic, or chromium were implanted into the femur of rabbits. The results for 12 of these animals are presented. For the first three years, the animals were normal in weight and showed no tumour formation. In 1941, one animal died from non-cancerous cachexia, three were clinically healthy, one showed a lung tumour on X-ray and the remaining seven died from malignant neoplasms. Of these, four showed metastatic tumours in the lungs, one had a tumour in the ilium (whether a local tumour or metastasis had not been determined)

The reaction becomes positive 10-20 days after the first symptoms of disease.—J. F. A. SPRENT.

LANG, W. W. (1945.) Impaction of the caecum.—*Vet. J.* 101. 154-156. 881

In a series of 100 consecutive cases of equine colic examined P.M. by L., every case of death from caecal impaction showed evidence of damage to the anterior mesenteric artery caused by the migration of *Strongylus vulgaris* larvae. It is suggested that, in caecal impaction, penetration into the anterior mesenteric artery by the strongyle larvae is followed by thrombosis, fibrosis and thickening of the arterial wall and surrounding tissues. The thickening of the wall constricts the nerve supply, producing enfeebled nervous and muscular action, arrested glandular secretion and finally, impaction of the caecum. The suggested lines of treatment aim at relieving the pressure on the bowel wall with the least possible delay. For this, the mechanical flushing action of 12 gal. or so of water by stomach tube is advocated. Relief of pressure allows the restoration of a certain degree of tonus which is enhanced by the addition to the water of 8 oz. of sodium bicarbonate and 12 oz. of common salt, to stimulate peristalsis. Alternatively, the intravenous injection of 2 pints each of 5% NaCl and 5% sodium citrate may be used. It is suggested that this is effective in dissolving the thrombus. Further experience suggests that a combination of these methods may give the best results in intractable cases. Many conditions attributable by L. to strongyle larvae, e.g., debility, recurrent colic, fickle appetite and low condition are said to benefit by the administration of NaCl by stomach tube.—H. I. FIELD.

VAN DER SAR, A., & HARTZ, H. (1945.) The syndrome, tropical eosinophilia and microfilariæ.—*Amer. J. trop. Med.* 25. 83-96. 882

The authors describe four human cases of tropical eosinophilia in none of which could circulating microfilariae be demonstrated. In three of them, asthmatic symptoms were present. At autopsy of one case unspecified microfilariae were discovered in the spleen among masses of eosinophilic leucocytes and giant cells. At biopsy one case showed microfilariae in the enlarged axillary lymph nodes with very large numbers of eosinophilic leucocytes. These cases are of veterinary interest in that they show that blood examination is insufficient for the diagnosis of filarial diseases, that the significance of eosinophilia in parasitic and other diseases is as yet very little understood, and that the occurrence of asthmogenic bronchitis may be a misleading symptom, because it focuses attention on the lungs as the primary seat of disease.—J. F. A. SPRENT.

and two showed local tumours. By X-ray it was shown that the local metal deposits had been "absorbed". The metal deposits were considered to have been the probable cause of the tumours seen, since spontaneous tumours are rare in rabbits and the tumours arose at the site of the metal deposits.—E. COTCHIN.

I. WEISCHER, F. (1944.) Erbbedingtheit und Bekämpfung der Rinderleukose. [Heredit and control of bovine leucosis.]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 83-84. Erratum note, p. 240. 884

II. ULM, K. (1944.) Zum Artikel: "Erbbedingtheit und Bekämpfung der Rinderleukose" von Weischer. [On Weischer's article "The heredity

and control of bovine leucosis"].—*Dtsch. tierärztl. Wschr.* [Tierärztl. Rdsch. 52/50. 255. 885

I. The importance of heredity in cattle leucosis is illustrated by an account of the disease occurring in 149 out of 160 daughters of an affected bull with the sole survivor now showing the first symptoms of the disease, i.e., fall in food utilization and milk yield, debility, etc. About half of the bull's progeny became affected and were slaughtered when 1-3 years old and the remainder when 3-6 years old, except for the single surviving cow. Cattle leucosis may thus be transmitted as a fully dominant character; this is borne out by the observation that slaughter of affected animals and of their progeny is rapidly effective in eliminating the disease. W. believes this to be the only example ever cited of the all-important influence of heredity in bovine leucosis and emphasizes the importance of applying the

See also absts. 886 (tumours in animals in Moscow zoological park).

DISEASES, GENERAL

TSVETAIEVA, N. P. (1941.) Bolezni zhivotnykh Moskovskovo zooparka. [Diseases of animals in the Moscow zoological park.].—*Trud. moskov. Zooparka.* 2. No. 2. pp. 153. [German summary.] 886

Of the diseases encountered in 1935-39 the following were notable. Paratyphoid, in extremely varied forms, was observed in all classes of animals; in mammals the gastro-intestinal tract was generally infected, whilst in birds the disease took the form of septicaemia. Bacteriologically, pure cultures of *Salmonella enteritidis*, *S. typhi-murium*, *S. paratyphi-B*, *S. schottmülleri*, *S. cholerae-suis*, and *S. pullorum* were obtained.

Tuberculosis was not widespread. Monkeys were chiefly affected, only isolated cases occurring amongst other mammals. Amongst birds, terrestrial forms, principally gallinaceous birds and pheasants in particular, were the most susceptible. Pathological symptoms depended on the particular group infected, monkeys having an initial tuberculous pneumonia, and Artiodactyla a chronic productive form, whilst in birds the gut was the main site of infection.

Acid-fast bacilli, non-pathogenic for warm-blooded animals, were isolated from lesions in 8.8% of 237 reptiles examined. Monitor lizards and grass snakes were chiefly susceptible. Although no group was specifically prone to haemorrhagic septicaemia, varied forms occurred in scattered instances amongst birds and mammals. Necrobacillosis was observed in the kangaroo and in Artiodactyla. The former were particularly susceptible, with consistently specific symptoms of periosteitis, suppurative myositis, meningitis, otitis, etc., whilst in the latter the gastro-intestinal tract was often seriously affected; the symptoms are described in detail. Bacillary dysentery, peculiar to newly introduced monkeys, did not occur following vaccination [vaccine unspecified]. Feline distemper was peculiar to the Family Felidae, affecting primarily newly introduced or young individuals. The clinical symptoms were those of enteritis of the small intestine. Sepsis, largely resulting from injury, was widespread. The subject is discussed at length.

Tumours were on the whole rare. The following mammalian cases were observed: rabbit (*Oryctolagus*), malignant adenoma of the uterus, and metastatic sarcoma; nutria (*Myopotamus coypus*), thyroidal adenocarcinoma; Indian elephant, uterine fibromyoma; bison, cancer of the testicle; reindeer (*Rangifer tarandus*), dermal fibroma; monkey (*Pithecus eutellus*), hepatic adenoma. Tumours were somewhat more prevalent

findings to the control and elimination of the disease.

In describing the bull W. states that it had a considerable amount of East Prussian blood from both sire and dam. In a correction published in the next issue of the journal this statement is said to have been incorrect.

II. Commenting on the article abstracted in I, U. points out that whilst leucosis in cattle seems to occur more frequently among the progeny of affected parents, it can, according to his experience, more often be traced to a diseased cow than to a bull. He considers that it would be unwise to conclude from the very exceptional instance quoted that bovine leucosis is a true inherited disease, transmitted by a dominant gene. The possibility of a mutation as a cause of leucosis must be considered, as also the part played by factors other than heredity.—E. G. WHITE.

amongst birds, particularly the budgerigar, *Melopsittacus undulatus*, in which were found both sarcoma and adenocarcinoma. There was a single case of tumour of the lung in a tortoise (*Testudo horsfieldi*) and of lymphangioma in the abdominal cavity of a fish (*Barbus* sp.).

The parasites and fungal infections of all animals examined P.M. are described. All kangaroos, muskrats and seals examined were parasite-free. Most Artiodactyla were infected with *Trichocephalus* spp. and strongyles. *Heterakis* spp. was the most frequent parasite of gallinaceous birds. The importance of prophylactic measures is stressed, and the more applicable of these described.

Fifteen pages are devoted to deficiencies of vitamins A, C and D, and to disorders of metabolism. Symptoms and prophylactic measures are described in detail.

The final chapters deal with diseases from a comparative viewpoint, i.e., according to the Class infected, and the mammals are discussed Order by Order.—L. L.

MÉNDEZ, E. P. (1941.) Genetic resistance to diseases.—*Thesis, Cornell.* pp. 102. 887

No original experimental or research work is reported. M. discusses the problem under the headings of hereditary diseases, inheritance of natural immunity, genetical aspects of resistance and susceptibility to diseases, and the study of genetic constitution for disease resistance. No conclusions are drawn.

—H. L. GILMAN.

VÖLKER, E. (1943.) Die Dehydration des Hufödems durch Periston. [Dehydration of hoof oedema by the use of periston.].—*Dtsch. tierärztl. Wschr.* 51. 89-91. 888

Perfusion of an isolated horse's foot with Ringer's fluid produces oedema, which is, however, prevented or relieved by the addition of a 7% solution of periston (polyvinylpyrrolidone). The administration of 4 litres of such a solution to a horse after the withdrawal of 6 litres of blood, produces no ill effects and its use is advocated for cases of laminitis.—A. T. PHILLIPSON.

BALDWIN, E. M., Jr. (1945.) A study of bovine infectious keratitis.—*Amer. J. vet. Res.* 6. 180-187. 889

The disease under study commences as an acute conjunctivitis followed by keratitis and ulceration of the cornea, which may heal or develop to a chronic ulcerative keratitis with a secondary invasion by pyogenic bacteria.

Infectious keratitis occurs during the summer or

early autumn. The most common source of outbreaks is the introduction of infected cattle. Once established, the disease may recur annually and spread to other farms.

Bacteriological examination of the eyes of 112 infected cattle in California and Montana revealed the presence of *Haemophilus bovis* in 83% of the animals, whilst the organism could not be isolated from the eyes of 20 healthy animals. Twelve out of 15 calves were infected by the instillation of bacterial suspension into one or both eyes and two calves infected at a first experiment proved immune to a second attempt at infection. [No evidence is produced that the experimental disease was infectious.] No ocular reaction to instillation of bacterial suspensions was obtained in g. pigs, rabbits or sheep. The organism grew best on slightly alkaline solid medium enriched with 5% citrated horse blood.—U. F. RICHARDSON.

GILLARD, A. (1945). Ophtalmie des bovidés. [Ophthalmia in cattle.—*Rev. Agric., l'île de la Réunion*. 45, 66. 890

The clinical features and treatment are described, of a seasonal form of conjunctivitis and keratitis which is said to be common in Reunion Island and which chiefly affects young cattle. Starting with epiphora, inflammation of the conjunctiva, swelling of the eyelids and photophobia going on to diffuse keratitis, it terminates in some cases in ulceration and purulent infection of the eyeball. Treatment with boracic lotion and yellow oxide of mercury ointment is said to be efficacious if started early. For severe cases, irrigation with a solution of $\frac{1}{4}$ -1 part mercuric chloride per thousand parts of warm water is used. Affected cattle are kept in darkened sheds to protect them from attack by flies as well as from the effect of strong sunlight. The causation of the condition is not discussed.—M. C.

ÜBERREITER, O. (1944). Die Splenektomie und ihre Indikationsstellung beim Hunde. [Splenectomy and its range of application to the dog.—*Arch. wiss. prakt. Tierheilk.* 79, 176-196. 891

U. refers to the literature on the spleen of normal and diseased animals and describes his own experiences at the Veterinary School at Vienna.

Conditions which may call for splenectomy include traumatic rupture, needing the removal of the whole or part of the spleen, haematoma of the spleen, congestion due to defective removal of blood from the organ as occurs in torsion of the splenic vein, thrombosis, neoplastic hyperplasia and the presence of localized neoplasms or cysts; Banti's disease, splenic abscess and swelling secondary to leucaemia or haemolytic anaemia. These diseases were recognized in dogs both before and after death.

Sections on the diagnosis of splenic disease and on surgical anatomy in the dog conclude the paper.—J. E.

VELLER, A. A. (1941). Kishechnye kamni u loshadei i ikh operativnoe udalenie. [Intestinal calculi in horses and their operative removal.—*Trud. XV Plen. vet. Sekts. Akad. sel'khoz. Nauk, Moscow, 1939*. [Diseases of Horses.] pp. 240-249. 892

The author examined 199 calculi from 121 horses obtained from various parts of the Soviet Union. 88.5% of the calculi had a lamellar structure and of this percentage, 34% contained a nuclear foreign body; 6% had a granular structure and the remaining 5.5%, mixed structure. Thirty-two experiments on 15 normal horses were made to induce formation of the calculi. It was found that the majority of the foreign bodies introduced *per os* or placed freely in the lumen of the intestine were rapidly evacuated; where retained they

sometimes induced formation of calculus. All foreign bodies did not serve as nuclei for deposition and incrustation with salts; copper coins and lead plates, for example, were not affected but had rested in the intestine for more than a year, whereas in the case of a piece of leather fixed to the intestinal wall in the same horse there were definite signs of incrustation and lamella formation after 79 days. Results varied when calculi were introduced artificially into the intestine of normal horses; in two cases they were excreted soon, and in two other cases they increased in diameter by 1 cm. after nine months and by 1.5 cm. after four months. In the author's opinion, the formation of calculi is closely connected with the motor and chemical condition of the intestines and their contents, and also with the microflora and fermentative processes. The formation of calculi is connected with chronic disturbances of the digestive tract.

In the second part, the author describes improvements in the technique published in 1937 of the operations for removing calculi and the good results obtained by himself and his co-workers.

—A. MOLDAWSKY.

COLE, H. H., & KLEIBER, M. (1945). Bloat in cows on alfalfa pasture.—*Amer. J. vet. Res.* 6, 188-193. 893

Bloat was produced in dairy cows by pasturing them on alfalfa. The degree of bloat as observed by external symptoms was correlated with rumen pressure, which was measured by means of an instrument called a tympanometer. This instrument measures the pressure required to force a plate down on to a ring pressed into the flank of the cow. A pressure of 50-60 mm. of Hg was associated with severe symptoms of bloat. There was some indication that the consumption of large quantities of Sudan-grass hay by the cows previous to their being turned out to pasture prevented the onset of bloat [see *V. B.* 15, 301]. There was little correlation between the amount of hay taken and the amount of alfalfa consumed, as measured by gain in weight, minus weight of excreta and insensible loss of weight.—R. MARSHALL.

KISELEV, F. D. (1941). Infektsionnye zabolevaniya gruppy "influenta loshadei" i znachenie skipidara v ikh profilaktike i terapii. [Infectious diseases of the "equine influenza" group and the role of turpentine in their prophylaxis and therapy.—*Trud. XV Plen. vet. Sekts. Akad. sel'khoz. Nauk, Moscow, 1939*. [Diseases of Horses.] pp. 123-130. 894

K. discusses various diseases commonly included in the "influenta group" and criticizes the classification recommended by KOLYAKOV & ROZHNOV, according to whom there are three groups (a) influenza proper, due to a filtrable virus, (b) conditions clinically similar to influenza but which are not transmissible by blood inoculation and (c) infectious catarrh of the upper respiratory tract. From material obtained from 37 outbreaks and from his own experience K. distinguishes equine contagious pleuro-pneumonia, contagious catarrh of the upper respiratory tract and influenza proper. He also elaborates the accompanying table of the most typical symptoms and the changes found P.M. in these diseases and in strangles [p. 156].

K. discusses in detail also the therapeutic and preventive effect of turpentine and advocates the early intravenous administration of 0.0075 ml. per kg. body weight, repeated every three days up to 14 injections. In his experience the administration of turpentine to all horses on the farms affected cut short the outbreaks of equine contagious pleuro-pneumonia and contagious catarrh of the upper respiratory tract within a few days.

Treatment of contagious pleuro-pneumonia with neosalvarsan and its Russian equivalent, novarsenol, is not discussed beyond saying that the value of both

preparations is well known and they may be used simultaneously with turpentine and specific vaccines. —A. MOLDAWSKY.

DIFFERENTIAL DIAGNOSIS OF EQUINE RESPIRATORY INFECTIONS

DIAGNOSTIC FEATURES	CONTAGIOUS PLEURO-PNEUMONIA	INFECTIOUS CATARRH OF THE UPPER RESPIRATORY TRACT	INFLUENZA	STRANGLES
Character of Temperature.	Sudden onset; persisting on an average for six days.	Irregular; persisting 1-2 days but occasionally up to seven days.	Gradual increase; persisting on an average 2-5 days.	Gradual increase, depending on the ripening of the sub-maxillary abscesses, and falling rapidly after abscesses have been opened.
Visible Mucous Membranes.	Icteric.	Reddish, but occasionally traces of a yellow shade.	Brick-red, with occasional yellow tints. Swelling of the eyelids, lachrymation, half-closed eyes.	Hyperaemic.
Sub - Maxillary Lymph Nodes.	Not swollen.	Occasionally slightly swollen.	Not swollen.	Usually swollen; purulent lymphadenitis.
Cough.	Long drawn out; moist.	Abrupt.	No cough.	Slight.
Lungs.	Increased respiration. Dullness in lower regions. Signs of hepatization on 2nd-3rd days.	In the pure form lungs usually free; in the mixed form often complicated with pneumonia which develops in later stages.	As in infectious catarrh.	As in infectious catarrh.
Response to Neo-salvarsan.	Good.	None.	None.	None.
Course of the Epizootic.	Slow; cases tend to develop singly.	More rapid; several horses affected at a time.	Extremely rapid.	Rapid in young horses, slow in adult horses.
P.M. Findings in Lungs.	Croupous, haemorrhagic fibrinous, or purulent pneumonia with tendency to necrosis.	If complicated, broncho-pneumonia.	Catarrhal purulent pneumonia, without tendency to necrosis.	Focal or disseminated purulent broncho-pneumonia with tendency to sclerosis.
Acquired Immunity on Recovery.	Sufficient to prevent further infection.	Certain amount of immunity but duration not investigated.	Life-long immunity probable.	Long duration. Re-infection possible in exceptional cases.

ANDERSON, R., LIVINGSTON, W. K., & DOW, R. S. (1941.) Effect of chronic painful lesions on dorsal root reflexes in the dog.—*J. Neurophysiol.* 4. 427-429. 895

The presence of painful lesions of 15-40 days' duration induced by injecting croton oil into the sheath of a sensory nerve was found to have no influence on the presence or absence of dorsal root reflexes [reflexes acting through efferent fibres in the dorsal root] in the dog; this confirmed similar work carried out on cats. Dorsal root reflexes were shown in about 50% of both normal animals and those with painful lesions,

all reflexes being tested at normal body temperature. A lowering of body temperature increased the percentage of fibres involved in the reflex or revealed a reflex not observed at normal temperature. Reflexes were more constant and larger in the dorsal radial cutaneous nerve than in the saphenous nerve.—A. EDEN.

BIRRELL, J. F. (1945.) Otitis externa.—*Brit. med. J.* July 21st. 80-82. 896

Infection is considered to result from meatal congestion causing irritation and leading to scratching or other interference, with a consequent break in skin

continuity which allows the entry of the various organisms normally present in the condition. In this study of nearly 1,000 cases in human beings, *Pseudomonas pyocyanea* was recorded as the predominant or most regularly present organism of a number including staphylococci, diphtheroids, etc. Apart from the usual association of *Ps. pyocyanea* with green pus it appeared unrelated to the clinical symptoms.

In differential diagnosis, otitis media and, if pain is present, mastoiditis should be considered. A purely external otitis is probable if hearing is good and mucus is not present in discharges. The presence of mucus can be detected by the blackening of a ribbon gauze wick soaked in 5% lead acetate solution after 24 hours direct contact with the meatal lining.

Treatment, which should be designed to maintain dry and intact the horny lining which protects from external irritants, should consist in thorough cleansing of the meatus, preferably by gentle mopping and the application of appropriate lotions to the inflamed meatal walls. Watery and grossly hypotonic solutions should be avoided, as they easily damage unprotected living cells; selected solutions should be non-irritant and isotonic, should leave no deposit nor dry up sufficiently to cause pain on removal of the gauze wicks used in their application. For the reduction of acute oedema to allow cleansing, 20% sodium sulphate, 8% aluminium acetate or 10% ichthylol in hypertonic solution is recommended, the latter being preferred. Healing solutions recommended include 10% ichthylol in water or glycerin, 5% lead acetate and 10% argyrol or calamine lotion. For hardening the meatal skin when exudation ceases, 1% silver nitrate or 1% alcoholic solution of gentian violet is recommended; the latter should not be used until all discharges cease and is best for fungating or granular types. Syringing is contraindicated but may occasionally be necessary when secretions are too hard for preliminary mopping.

—S. A. EVANS.

BRITTON, J. W., & HOWELL, C. E. (1945). Observations on sterility.—*Vet. Med.* 40. 264-268. 897

The authors attempt to evaluate the relative importance of the main causes of sterility in mares by reference to the breeding records for 1927-43 of 36 mares and 10 stallions at the University of California Arab Horse Ranch. The results summarized indicate the causes of loss of breeding time (i.e., failure to get mares into foal), with their relative importance, calculated on a percentage basis, to be as follows:—failure to show heat, 34.8%; failure to show heat after an unsuccessful breeding at the foal heat, 14.4%; delayed onset of foal heat, 11.7%; long heat periods, 2.3%; repeated breedings with no conception, 13.4%; 23.4% of failures followed dead or diseased foals. Irregularities of the oestrous cycle were thus the most important causes of loss of breeding time (63%).

There was no significant relation between the frequency of failure to show heat and the age of the mare, or the year or month. There was a tendency for individual mares to repeat this abnormality. Abnormally long heat periods (up to 75 days, average one month) were recorded, with one exception, only in the months December to March inclusive. In 13 such cases (ten mares), ten conceptions followed repeated breeding during the long heat period. Thirteen mares accounted for the 17 recorded dead or diseased foals; as a group these mares averaged 12 years of age. The results in this study confirmed that at the foal heat the percentage of conceptions to mating was significantly lower than at subsequent heats.

Twenty-seven mares, which had failed to show signs of heat were injected subcutaneously with 750-

1,000 rat units of pregnant mare's serum. Heat was induced in 18 mares after an average of four days. Ten of the 18 mares conceived to mating at the induced heat; five failed to conceive at the induced heat but conceived at the subsequent normal heat. The remaining three mares failed to conceive at any heat period.

As an aid to increasing the fertility in horse-breeding establishments, the authors stress the value of biological tests (rat tests at 45th day) for early pregnancy, particularly as a means of detecting prolonged anoestrus following unsuccessful breeding.—N. J. SCORGIE.

— (1945). The examination of the stud bull for soundness. Discussion by the Central Veterinary Society. [Speakers:—SCORGIE, N. J., STEWART, D. L., & CONN, E.]—*Vet. Rec.* 57. 459-464 & 472-474. 898

In this discussion, SCORGIE emphasized that the examination of a bull for soundness centres on his reproductive efficiency. Unsoundness may be due to interference with sexual desire, inability to copulate, reduced or inhibited capacity to fertilize, the presence of an infectious or contagious disease affecting the bull's natural usefulness, or any defect or abnormality which is likely to be hereditary and affect the usefulness of the progeny. The examination of a bull should include a survey of checks of identification and the animal's general condition, inspection for any abnormality of gait or lameness or anatomical defect liable to interfere with the act of service, examination for infectious or contagious conditions, e.g., trichomoniasis and external parasitism, examination of the external genitalia and observation of service behaviour, including tractability and reaction time for service. The age of the bull must be taken into consideration in relation to interference with sexual desire; in young bulls lack of desire is usually temporary as a result of lack of experience and should not be regarded as an unsoundness. The psychological factor in older bulls must be recognized. Inability to copulate may result from immaturity, morbid changes in the skeleton, muscles, joints or feet, inflammatory condition of the penis or mechanical obstruction, such as "pot belly". Reduced capacity for fertilization is the most common form of unsoundness encountered in the bull and must be diagnosed from the breeding history and semen examination. Morbid conditions responsible for reduced fertilizing capacity include hypoplasia testis, degenerative testicular atrophy, inflammatory testicular changes and fibrosis testis. Amongst hereditary non-lethal defects encountered are hypoplasia testis, cryptorchidism, cataract and viciousness.

STEWART dealt with the evaluation of semen and with fertility tests. A standard of 2-0 services for conception is considered normal and satisfactory; 2-0-3-5 services are permissible in valuable bulls, but more than 3-5 render the bull quite unsatisfactory. S. discussed sub-fertile bulls, variations in individual bulls, and apparently normal semen which proved ineffective and which required more detailed investigation. In the examination of semen an average volume of 4 ml. (range 1.5-20 ml.) is considered normal. A density of 500 million spermatozoa per ml. is a minimum compatible with normal fertility. Low-power examination under the microscope of semen at 37°C. should show good wave motion and motility. Fresh semen stored at 40°F. should retain good motility for 30 hours, and when diluted 1:3 with egg-yolk buffer solution should maintain motility for well over 100 hours. In discussing artificial insemination a number of miscellaneous practical hints were given. In classifying bulls at one examination, one should consider the bulls history and then collect four samples of semen over a period of one half to one hour; the semen samples should show good

motility and wave motion and no more than one poor sample should be allowed if the bull is to be passed as sound. Given the history and results of semen examination bulls may be classified as fertile, sterile or doubtful; in the latter case retests should be made within 7-14 days. Where no history of conception rate is available 2-3 examinations should be made at weekly intervals before an opinion is given. S. gave some interesting examples of the behaviour of bulls at artificial insemination centres, and some general remarks on the psychology of bulls in which he emphasized the consideration of each bull as an individual.

CONN discussed veterinary advice to purchasers of bulls. Pedigree and records should be examined and stamina, type, etc., confirmed by inspection; a general veterinary examination is desirable. C. emphasized that examination of the records of daughters, sisters and half-sisters of the bull is necessary and underlined from the practical aspect the principal points already made by the preceding speakers.

In the subsequent discussion various speakers made reference from their own experience to many of the points mentioned, the main emphasis resting on exact standards for doubtful bulls, psychological and hereditary factors, and latent conditions of disease and anatomical abnormalities.—A. EDEN.

*FLORIN, M. C. (1941.) *Porcine nephritis*.—*Thesis, Cornell*. pp. 31. 899

See also absts. 881 (equine colic), 932 (hermaphroditism in a horned goat), 964 (running fits in dogs), 965 ("stiff lamb" disease), 980 (diseases of cattle and buffaloes in India), 1001, 1002 (livestock diseases in New South Wales), 1006 (in Australia), 1007 (in Gold Coast Colony), 1008 (in California, U.S.A.).

NUTRITIONAL AND METABOLIC DISORDERS

MILLER, R. C. (1945.) Some present day aspects of livestock nutrition.—*Cornell Vet.* 35. 128-136. 901

In this review paper M. summarizes the results of some recent research in livestock nutrition. Particular points discussed include the following:—vitamin deficiencies in cattle, including the vitamin requirements of new-born calves, the relation of vitamin A deficiency and acetonæmia in cattle, the use of protein and urea in cattle feeding, the stimulation of milk production in dairy cows by the feeding of iodinated protein, and the feeding of swine, with particular reference to vitamin requirements.—N. J. SCORRER.

MAUN, M. E., CAHILL, W. M., & DAVIS, R. M. (1945.) Morphological studies of rats deprived of essential amino acids; I. Phenylalanine.—*Arch. Path.* 39. 294-300. 902

Young rats were fed in pairs for 28 days on a synthetic diet deficient in phenylalanine, the controls being fed on an exactly similar diet except for the addition of 11.2 g. phenylalanine per 500 g. of diet. Details of the composition of the rations are given. Two rats in the phenylalanine-deficient groups died on the last day of the experiment and the remainder were then killed for biochemical and histological examination.

Although both groups consumed an equal amount of food, rats in the deficient group lost weight more rapidly and became progressively weaker than those on the control diet. Their haemoglobin value was 7.4-14.0 (average 9.9) g. per 100 ml. and their plasma protein 4.71 g. per 100 ml. compared with 13.7-15.8 (average 14.7) g. and 5.58 g. for the controls. There was no significant difference in the hepatic fat of the two groups.

Histological study of the heart, blood vessels, lung, liver, spleen, kidneys, urinary bladder, digestive tract, skin, voluntary muscle, brain cord and nerves, eyes, pituitaries, thyroids, lymph nodes, pancreas, bone

The frequency of pathological changes in the kidney of swine has long been recognized. F. made a study of pale, fibrous and pitted kidneys obtained mainly from packing houses in New York State. Kidney lesions were found to be common with interstitial nephritis most commonly encountered. The focal types are much more frequent than the diffuse. Acute, subacute and chronic forms of the disease occur. Degenerative lesions involving glomeruli and tubules, without inflammation, were often encountered. Bacteriologic findings gave no clue to the aetiological agents involved.—H. L. GILMAN.

RENK, W. (1944.) Aplasie des Euterdrüsenorgans in den beiden Vordervierteln einer Kuh. [*Aplasia of mammary gland tissue in a cow.*]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 141-144. 900

R. describes a case of aplasia of the glandular tissue of both fore-quarters of a cow, with compensatory hypertrophy of the hind-quarters. The teat and teat canal were developed on each side, but the milk cistern was only partly formed, being separated from the normal tissue of the hind-quarters by fibro-muscular tissue. The anomaly probably originated in the 3rd-4th month of intra-uterine life and although it did not reduce the productive power of the udder, the breeding value of the cow was reduced by the possible hereditary nature of the defect.—E. COTCHIN.

marrow and female genitalia revealed no significant differences in the two groups, except for early pneumonic changes in the two rats which had died.

In rats on the deficient diet there was narrowing and irregularity of the epiphyseal cartilages. There was also marked atrophy of the thymus beginning with thinning of the lymphoid elements of the cortex, with corresponding dominance of medullary stroma and formation of Langhans' giant cells. Adrenals were macroscopically unchanged but the cortex was often thinner than in the control group, its lipid content was decreased and the intermediate zone showed irregular mitoses, vascular enlargement and compression of the cells. Testicular atrophy was marked, the seminiferous tubules appearing smaller and filled with accumulations of eosinophile cells and cellular debris. Spermatogenesis appeared to stop at the primary spermatocyte and the Sertoli cells were unusually prominent. Some of these lesions were noted by various authors as occurring during starvation or when lysine-deficient diets were fed. The histological changes are demonstrated by photographs.—R. M. ARNOLD.

KAUFMANN, O. W., & SHAW, J. C. (1945.) The use of simplified diets in the study of the fat metabolism of the mammary gland.—*J. Dairy Sci.* 28. 467-472. 903

Cows in milk were fed a simplified basal diet to which was added varying amounts of skim milk, milk fat, starch, glucose and casein, in order to determine which constituents were the precursors of the fatty acids of lower molecular weight in milk fat. The effects were assessed by determination of the Reichert-Meiss and iodine values of the fat in the milk secreted over the next 3-4 days.

The results indicate that, when fed as the sole diet, carbohydrate provides the precursors of these fatty

acids. Blood glucose does not appear to be the precursor in blood of these acids, which proves that the dietary carbohydrate acts indirectly, possibly by being converted into the necessary precursors by the action of micro-organisms in the rumen, or by exerting a sparing action on the utilization by other body tissues of the actual milk fat precursors. Experiments with protein as the dietary precursor using 4-6 lb. of casein were negative by the same reaction (apparently indigestion) caused in the cows within 4-8 hours; death resulting in one case.—A. EDEN.

McINTOSH, R. A. (1945). Cobalt deficiency.—*Canad. J. comp. Med.* 9, 179-182. 904

The symptoms of Co deficiency are insidious in character and are manifested by a loss of appetite for suitable food and a craving for unnatural material, with resultant emaciation, weakness and anaemia. The condition seldom occurs in cattle or sheep until after they commence to ruminate and is rarely found in adults. It was observed in cattle where it was not possible to be critical of the ration and was corrected by the addition of Co, without other modification of the diet.

The author recommends the oral administration of about 0.1 g. of cobalt sulphate daily to affected cattle; an improvement in the appetite can generally be observed in 3-7 days. Once the affected animals commence eating, the Co can be fed on the grain ration.—THOS. MOORE.

ELLIS, V. A. (1945). Cobalt deficiency in lactating cows.—*Canad. J. comp. Med.* 9, 244. 905

E. reports a condition which he diagnosed as Co deficiency in lactating cows on pasture of fair quality on farms located along the sea coast of Nova Scotia, most of which were fed a concentrate supplement of ground grain. Their appetites gradually diminished and their milk flow was reduced over a period of several weeks.

After the administration of a daily dose of 1.5 grains of cobalt sulphate in solution, the appetite and milk returned to normal in 4-10 days and in several cases the milk flow was greater than at the time of freshening.

—THOS. MOORE.

BRAUDE, R. (1945). Some observations on the need for copper in the diet of fattening pigs.—*J. agric. Sci.* 35, 163-167. 906

It had been observed that pigs kept in a modern piggery of tubular iron structure showed a keen craving for metallic copper, as evidenced by the licking and biting of copper rings which had been fitted at the bottom of the iron tubes to prevent the latter from rusting. In tests in which pigs were allowed access to small plates of six different metals (aluminium, brass, copper, magnesium, nickel and tin) it was noted that the pigs licked the copper plates and occasionally the brass but left the other plates untouched. With a view to obtaining information on the nutritional significance of copper in the diet, two feeding trials were conducted involving 24 pigs, 14 weeks old at the beginning and 36 weeks old at the end of the experiments. There was no apparent advantage in supplementing a normal diet for fattening pigs containing about 5 p.p.m. of copper with copper sulphate solution. The addition of a mixture of copper sulphate, manganese sulphate and iron pyrophosphate to the same normal diet had also no effect on the rate of growth or on the food consumption of the pigs. The haemoglobin and copper contents of the blood were unaffected by the addition of copper to the diet. The results of the feeding trials provided no clue to the observed craving for metallic copper.

—N. J. SCORGIE.

TERESI, J. D., HOVE, E., ELVEHJEM, C. A., & HART, E. B. (1944). Further study of boron in the nutrition of the rat.—*Amer. J. Physiol.* 140, 513-518. [For previous paper see *V. B.* 10, 196.] 907

An attempt was made to prepare a diet which contained only 25 µg. of boron per kg., but weaned rats failed to grow on this diet even when boron was added. In the process of preparation the casein had undergone chemical change. Two diets, one containing a high fat ration and one containing a high carbohydrate ration and each containing a low level, 155 µg., of boron per kg. were fed to weaned rats. No differences in growth rates were observed between rats on either diet alone and when boron was added. Groups of female rats with young were fed a basal ration containing 155 µg. of boron per kg. and one group received additional boron. There was no significant difference in the survival of the young through the nursing period between the group on the basal ration and the one receiving additional boron. Details of the diets and tables are given.

—E. M. J.

SEATH, D. M., BRANTON, C., & GROTH, A. H. (1945). Effect of feeding iodinated casein on production and health of milking cows.—*J. Dairy Sci.* 28, 508-517. 908

Dairy cows fed synthetic thyroprotein (iodinated casein) have been generally reported to show increases in total milk yield, butter-fat percentage, and pulse rate. Two experiments were conducted to test the effect of such feeding on the production and health of cows under the relatively warm and humid climatic conditions of Louisiana. In a reversal trial, six cows were used: three of them (group 1) received 15 g. iodinated casein daily during the first period, the other three (group 2) serving as controls; in the reversal period, group 2 received the iodinated casein, group 1 serving as controls. In a continuous trial, 12 cows received approximately 1.5 g. iodinated casein per 100 lb. live weight daily.

Significant increases in milk yields and butter-fat percentages were observed during the reversal trial, but during the continuous trial, although a higher butter-fat percentage was shown for the first six weeks, and increased milk yields for the first five weeks, the control cows later showed a higher average production. The average pulse rate increases were 10 and 13 per min. in the reversal and continuous trials respectively. An increase in body temperature was noted and the cows receiving the iodinated casein appeared to react, as judged by body temperature, in a more sensitive manner to changes in atmospheric temperature than did the control cows. During the reversal experiment, three cows showed excessive body weight losses.

The results obtained indicate that it is highly questionable whether the increased production secured by feeding iodinated casein under Louisiana conditions would be great enough or would continue over a long enough period to justify possible injury to milch cows that might result from losses in body weight, increase in pulse rate, and higher body temperature.—E. C.

WESPI-EGGENBERGER, H. (1944). Die Jodprophylaxe des Kropfes; ihre Grundlagen und ihre Erfolge. [Iodine prophylaxis of goitre. Its basis and results.] —*Munch. med. Wschr.* 91, 199-205. [Abst. in *Bull. Hyg., Lond.* 20, 34, slightly amended. Signed: H. HAROLD SCOTT.] 909

[This article contains much miscellaneous information on iodine and thyroid affections. It is of an academic character yet with insufficient detail for specialists.] The author starts with a brief history of the use of iodine in goitre, telling how, thousands of

years ago, the Chinese empirically used seaweed as a remedy; centuries later iodine was discovered and used in a purified state. To come nearer to our own times, a little more than a century ago, in 1831, Boussingault in France suggested the addition of iodine to salt in areas where goitre was endemic, partly for treatment, partly for prophylaxis. In 1849 Prevost formulated the iodine deficiency theory and in 1895 Hunziger followed up the work of Baumann in Freiburg finding that iodine was present in all thyroids.

Next, the author makes a few remarks on the diffuse and nodose forms of goitre, on the prevalence of goitre and cretinism in a few of the Cantons of Switzerland, and on the results of analysis of the soil for iodine in four districts of New Zealand, of the water supplies in nine districts of Hungary and the relative frequency of goitre in the same districts. Lastly, he presents tables showing the daily output of iodine in the urine of persons living in four districts of Holland and five of Norway, correlating those figures with the percentage prevalence of goitre.

DAVIDSON, W. B. (1945.) Nutritional deficiency diseases, their sources and effects.—*Canad. J. comp. Med.* 9. 155-162. 910

The deficiency encountered most commonly in Western Canada is probably that of phosphorus. Alfalfa, with low P and high Ca values, is a factor to be considered. Heavy infestations with roundworms interfere with P metabolism, especially in sheep. Annual rainfall is also important. Blood analysis cannot be depended upon as a means of diagnosis as deficiency may be present for sometime before a lowering of the P level occurs.

The most important deficiency disease in South-Western Saskatchewan is urinary calculi of steers. Many spring calves become affected while still being nursed by their dams. Urinary calculi in wether lambs in feedlots is apparently due to lack of Ca. A multiple deficiency disease complicated by a parasite factor, *Haemonchus contortus*, occurs in sheep when the range is very dry. Heavy rainfalls result in rapid recovery. An unusual type of multiple deficiency disease occurred in the summer of 1939 and 1940 in one district when the dried grass was very low in P (0.018%) and contained very little protein and no vitamin A or D. A progressive type of incoordination and paralysis affecting sheep was treated by the addition of 1% copper to the salt licks.—R. GWATKIN.

MCCHESNEY, E. W., & GIACOMINO, N. J. (1945.) Studies of calcium and phosphorus metabolism in the chick. III. Some time relationships in the action of vitamin D.—*J. Nutrit.* 29. 229-235. [For part II, see *V. B.* 14. 349.] 911

The mineral balances of baby chicks, fed a ration free of vitamin D, were investigated from the 6th to the 20th day of age. Retention of Ca and P (calculated as mg. retained per 100 g. of chick per day) decreased during this period, presumably owing to the gradual lowering of the inherited vitamin D reserves. The level reached at the 20th day, *viz.*, about 20 mg. for both Ca and P, and termed by the authors the resistance level, was maintained until deaths from rickets began to occur at five weeks of age, when very low retentions were observed. At this point presumably all vitamin D reserves were exhausted. An oral supplement of 60 I.U. of vitamin D₃, or 2,400 I.U. of vitamin D₂, increased the retention of Ca and P, the effect lasting 7-8 days, when retention again fell until it approached the resistance level. A second administration of either supplement in the same amount again increased mineral retention, but to a lesser extent, presumably because

the dose per g. of body weight was less, the chicks meanwhile having increased in weight. The data offered no clue as to the reason for the marked difference in antirachitic potency which exists between these two forms of vitamin D when administered to the chick.—E. M. CRUCKSHANK.

DURRELL, W. B. (1945.) Avitaminosis "A" in poultry.—*Canad. J. comp. Med.* 9. 163-165. 912

D. discusses symptoms and P.M. findings in vitamin A deficiency in poultry, emphasizing the need for food containing vitamin A or carotenoid pigments throughout the year. Alfalfa meal is the best source of carotenoid pigments, while fish liver oil is the best source of vitamin A. The vitamin stored in the liver is not great enough to compensate for many weeks on a vitamin A-free diet.—J. A. NELSON.

BRUCE, R. H. (1945.) Three-day scours in calves.—*N. Amer. Vet.* 26. 602-603. 913

B. describes a syndrome in calves (especially those of high-producing Holsteins) born during the winter months and distinguishes it from classical calf scours. Illness commenced within 12-20 hours of birth and was characterized by rapid prostration, slight fever (temperatures approximately 104°F.) and dehydration, with diarrhoea and sometimes pneumonia, ending in death within 24-48 hours.

These epidemics could not be controlled by hygienic measures, by vaccination or other methods based on the conception of the disease as a bacteriological entity, or by administration of vitamins A, D and B to the calves.

Dosing of the cows twice weekly for the three weeks before calving with 500,000 units vitamin A caused a dramatic cessation of deaths in the calves born. Unfortunately no undosed control animals were maintained, nor were estimations made of the vitamin A content of milk, livers of calves, etc.—R. M. ARNOLD.

MOSTYN, H. J. (1945.) Oral changes in dogs due to vitamin therapy.—*Vet. Med.* 40. 382-383. 914

The oral lesions which occur in dogs as a result of deficiencies of certain members of the vitamin B group are briefly reviewed. No original work is reported. [No examples are given of ill-effects following vitamin therapy.]—R. ALLCROFT.

MOORE, L. A., & COTTER, J. W. (1945.) The relationship between a low carotene intake and urinary excretion of ascorbic acid in dairy cattle.—*J. Dairy Sci.* 28. 495-506. 915

The daily excretion of ascorbic acid in heifers fed a normal ration varied from 26 to 111 mg., and when such animals were fed 5 g. chlorobutanol for ten days in addition the daily excretion rose to levels varying from 210 to 399 mg. The ascorbic acid excretion of pregnant heifers fed a low carotene diet was 4-6 times greater than that of similar animals receiving a normal diet. Chlorobutanol had little effect in raising the output of ascorbic acid from pregnant heifers on a low carotene intake, nor did it materially raise their plasma ascorbic acid levels.

Male animals appeared to be rather variable in their daily urinary excretion of ascorbic acid and the amounts excreted were independent of the carotene intake except where the latter was very low, when the ascorbic acid output decreased. Male animals generally appear to excrete considerably more ascorbic acid per unit body weight than females.

So far there is no evidence that a low carotene intake under ordinary farming conditions has such a depressing effect on ascorbic acid synthesis that breeding efficiency is altered or impaired.—A. EDEN.

FULTON, A. A. (1945.) Value of supplements of vitamin C in preventing lactational mastitis.—*Brit. med. J.* Oct. 13th. 488-491. 916

F. suggests that vitamin C deficiency may be a predisposing factor to lactational mastitis, as to other diseases. Women of one group were each given a 50 mg. tablet of ascorbic acid daily during the last three

See also absts. 775 (carotene), 786 (diet and immunity), 886 (vitamin deficiencies in animals in Moscow zoological park), 893 (diet and bloat in cattle), 964 (canine hysteria cured by raw protein), 965 (vitamin E in "stiff lamb" disease), 1006 (nutritional and metabolic disorders of Australian sheep).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

*RANGSIT, P. (1941.) Experiments on the cardiovascular, respiratory, and secretory mechanisms of the sheep.—*Thesis, Cornell*. pp. 69. 917

R. reports a series of experiments on 13 sheep to determine the effects of anaesthesia on the nervous regulation of blood pressure and heart beat, and the action of certain drugs on the cardiovascular mechanism and on the regulation and mechanics of respiration. Observations are also made on such secretions as saliva, bile, pancreatic juice and urine.

In comparison of certain anaesthetics, ether was found to have a very small margin of safety; nembutal and chloral hydrate were both effective, but unless combined with ether inhalation, the doses had to be repeated frequently in order to keep the animals anaesthetized for the long periods of time necessary in these experiments.

The average blood pressure in sheep which had received an injection of a local anaesthetic was found to be 129 mm. Hg. Chloral hydrate and nembutal, when injected rapidly, caused a drop in blood pressure of about 50%, but with slow injections there was little or no effect. Tightly tying the vagus nerve caused a rise of blood pressure in four out of ten animals; in others, it caused a fall, or had no effect. Atropine, injected subcutaneously in five unanaesthetized sheep, always caused an increase in the heart rate. Stimulation of the peripheral end of one vagus nerve never caused complete inhibition of the heart, but only slowing. One out of five stimulations of the peripheral ends of both vagi caused stoppage of the heart. Stimulation of the central end of the vagus as well as the sciatic nerve usually gave a rise of blood pressure. A fall was observed in one animal when the vagus nerve was stimulated, but in no animal when the sciatic nerve was stimulated. Stimulation of the peripheral end of the splanchnic nerve caused a rise of blood pressure of 80-90%.

The action of atropine, pilocarpine and arecoline on the blood pressure seemed to be similar to their action in other animals. Histamine did not produce a primary rise of blood pressure under any condition, but always a fall, which was followed by a secondary rise in some instances. The negativity of the intrathoracic pressure as measured on four animals was found to be -8 to -14 mm. Hg. The lung was seen to collapse when a small opening was made in one side of the thorax, while on the other side it was still functioning until an opening was made on that side. Tightly tying the vagus nerve usually caused slowing and deepening of respiration unless the effect was influenced by nerve crushing. Stimulation of the central end of the vagus nerve with weak shocks very often produced a cough reflex; with strong shocks it usually caused an inhibition of respiration. Stimulation of the central end of the sciatic nerve gave inconstant results so far as respiration was concerned. The secretory pressure of the spontaneously secreting parotid gland was found to be about 40 mm. Hg (average of two determinations). The amount of parotid

saliva secreted in 10 min. was 9 ml. in one case, and 7 ml. in the other.

The injection of pilocarpine, arecoline and atropine did not produce any effect on the salivary secretion that could be said to be characteristic of the sheep. Inconstant effects on the salivary secretion and blood pressure changes due to nerve stimulations were produced by adrenalin injections. The average amount of bile obtained in three experiments was 14 ml. per kg. of body weight when calculated on a 24 hour basis. The average bile secretory pressure was 216 mm. bile. An acid extract of duodenal mucosa produced a distinct increase in the bile flow, while no definite results were obtained with pilocarpine, arecoline and adrenalin injections, nor with vagus stimulations. The quantity of pancreatic juice collected from one animal in ten hours was 13.5 ml. During this period injections of extract of duodenal mucosa were given. They were seen to increase the rate of flow markedly.

A copious spontaneous flow of urine from a single kidney was observed. The rate of secretion was increased by Na_2SO_4 and glucose, but inhibited by adrenalin. Blood pressure changes due to nerve stimulations had the same effect on urine secretion as reported in the literature for certain other animals.

—H. L. GILMAN.

HARVEY, E. N., BARNES, D. K., McELROY, W. D., WHITELEY, A. H., PEASE, D. C., & COOPER, K. W. (1944.) Bubble formation in animals. I. Physical factors.—*J. cell. comp. Physiol.* 24. 1-22. 918

HARVEY, E. N., WHITELEY, A. H., McELROY, W. D., PEASE, D. C., & BARNES, D. K. (1944.) Bubble formation in animals. II. Gas nuclei and their distribution in blood and tissues.—*Ibid.* 23-34. 919

HARVEY, E. N., McELROY, W. D., WHITELEY, A. H., WARREN, G. H., & PEASE, D. C. (1944.) Bubble formation in animals. III. An analysis of gas tension and hydrostatic pressure in cats.—*Ibid.* 117-132. 920

McELROY, W. D., WHITELEY, A. H., WARREN, G. H., & HARVEY, E. N. (1944.) Bubble formation in animals. IV. The relative importance of carbon dioxide concentration and mechanical tension during muscle contraction. V. Denitrogenation.—*Ibid.* 133-146 & 257-271. 921

[Abstracts in *Bull. War Med.* 6. 163-164, copied verbatim. Signed: R. H. WINFIELD.]

I. The authors consider the origin of gas bubbles appearing in organisms in various circumstances. A review of the literature is given, and it is noted that although bubbles may appear inside dead or damaged cells, they do not form within living single cells, even after decompression from very high pressures. Bubbles, however, occur in the blood vessels and occasionally in lymph vessels of small resting animals as a result of muscular contraction or injury to muscle. Bubbles form abundantly in both arteries and veins in resting animals and can be seen in many tissues after com-

pression and decompression (6-8 atmospheres). They may occasionally occur in the cerebrospinal fluid. In resting animals at high altitude it is believed that the bubbles come from minute gas nuclei, probably on the surface of cells rather than free in the liquid. Experimental evidence is produced to show that the high solubility of carbon dioxide favours rapid diffusion, thereby allowing rapid entrance and exit of carbon dioxide from bubbles.

II. The technique is described for searching for gas nuclei in blood. From three cats, 13 successive samples of blood were examined and no bubbles found, despite evacuation of the blood to 24 mm. of mercury below the vapour pressure of water at 38°C. (49 mm. of mercury). Evidence is given to show that both gas itself and also bubble-forming nuclei in liquids injected on the venous side of the heart do not survive the passage through the lung capillaries to appear on the arterial side.

The authors conclude that it is most probable that gas nuclei form on the walls of blood vessels, where they grow and break loose as minute bubbles.

III. The authors describe techniques for studying bubble formation in various animals, both at low pressures and in compression and decompression experiments. At decreased barometric pressures equivalent to an altitude of 45,000-50,000 feet, bubbles rarely developed in the postcava of cats anaesthetized with "Nembutal". If, however, the hind legs were stimulated electrically, bubbles regularly appeared in the postcava even at an equivalent altitude of 35,000 feet.

The many physiological factors involved in the appearance of bubbles in the vascular system of animals subjected to decreased barometric pressure are discussed, and the importance of the removal of nitrogen in the prevention of bubble formation is stressed.

IV. This paper contains an analysis of the relative importance of carbon dioxide concentration and mechanical tension developed during muscular contraction in bubble formation in cats both at high altitudes and after pressure treatment.

It is concluded that in both muscle contraction and trauma resulting in muscular injury, the primary factor in bubble formation is the reduced hydrostatic pressure due to the mechanical tension developed.

V. The authors describe a series of experiments to investigate the problem of bubble formation in animals at decreased barometric pressures. Experiments were performed on cats anaesthetized with "Nembutal", and it was found that the venous nitrogen content of resting cats breathing pure oxygen at atmospheric pressure fell rapidly in the first 30 minutes. The initial rate of removal of nitrogen from the veins is markedly increased by vigorous exercise. The rapid initial loss of nitrogen is believed to represent loss of gas from blood and tissues with an open capillary bed, while the subsequent very slow decrease represents slow diffusion of gas from fat and muscle tissues with closed capillaries. The acceleration of the removal of nitrogen from muscle by exercise is due to the increased blood flow causing hyperventilation and the opening of closed capillary beds.

STEWART, H. A. (1945.) An appraisal of factors affecting prolificacy in swine.—*J. Anim. Sci.* 4. 250-260.

There is great variability in the size of litters produced by females of the same age and pedigree and between litters from the same female. In the study here reported an attempt is made to identify some of the factors responsible for the non-genetic variance of litter size. The data used for analysis were gathered from the farrowing records of gilts belonging to 14

inbred lines and to a group of miscellaneous line crosses. The data were grouped to make the elimination of environmental variance possible. The following is a summary of the main findings:—Litter size increased with an increase in the age of the dam at farrowing, the effect of age being much greater up to 12 months than after. Litter size decreased with an increase in the inbreeding of the dam but apparently was unaffected by the inbreeding of the litter. The heavier gilts at breeding usually farrowed larger litters. On the average, gilts making the greatest gains during pregnancy farrowed the largest litters, but variations in gain may be an effect rather than a cause of variation in litter size. Age and weight at mating together accounted for 4% of the variation in size of first litters and together they provide the most reliable criteria for use in selection for fertility.—N. J. SCORGIE.

I. BARTON, M., & WIESNER, B. P. (1945.) Waking temperature in relation to female fecundity.—*Lancet*. 249. 663-668.

II. HALBRECHT, I. (1945.) Ovarian function and body temperature.—*Ibid.* 668-669.

III. BARTON, M., & WIESNER, B. P. (1945.) Thermogenic effect of progesterone.—*Ibid.* 671-672.

I. The authors confirm the observation of VAN DE VELDE (1904, 1929) that in the normal human female the body temperature is relatively low during the first, and relatively high during the second, half of the menstrual cycle. Their observations show that in the normal female the temperature exhibits the characteristic diphasic pattern. At the beginning of, or just before menstruation, the temperature drops (HL phase, or transition from high to low temperature). It tends to remain at a relatively low level for several days and attains a minimum during the mid-menstrual phase. It then rises (LH phase, or phase of thermal shift from low to high temperature), and retains a relatively high level until the end of the cycle. The most important deviation from diphasic rhythm occurs in pregnancy. Here the premenstrual phase of relatively high temperature (H.T.) is maintained, i.e., there is no HL phase. The persistence of H.T. in pregnant women suggested itself as a diagnostic sign and systematic observations on a large series of cases confirmed that a temperature level of 99°F. or more sustained for 16 days or longer was characteristic of pregnancy. Certain types of infertility were found to be associated with the H.T. phase. Evidence derived from timed inseminations, both artificial and natural, indicated that the LH temperature shift coincides with the ovulatory phase, but the occurrence of this shift did not constitute a proof of actual ovulation.

II. H. confirms that the normal temperature curves of women of child-bearing age are diphasic and that ovulation coincides with the onset of the rise in temperature at the inter-menstrum. It was found that this temperature rise was preceded by a slight fall, which probably corresponds to the moment of expulsion of the ovum from the follicle. It was also confirmed that a relatively high temperature maintained longer than 16 days following ovulation was indicative of pregnancy.

III. Variations in body temperature [see I] were found to be so closely linked with the phases of the ovarian cycle that they probably depend on ovarian secretion. To secure proof of this hypothesis, the authors attempted by administering ovarian extracts or pure steroid hormones to produce an artificial H.T. phase in infertile women with persistent low temperature, and to raise the body temperature in normal women with diphasic cycles.

The data show that progesterone administration invokes a thermal shift resembling the spontaneous LH

shift normally associated with ovulation and the luteal phase, whereas oestrogens and ovarian extracts free of identified hormones (*i.e.*, oestrogen and progesterone) do not elevate the body temperature. This, together with evidence from pregnandiol tests and endometrial biopsies, would appear to show that the occurrence of an H.T. phase indicates the secretion of progesterone; on the other hand, the absence of an LH shift may be caused not by progesterone deficiency but by other factors, such as non-reaction to the hormone.—N. J. S.

HAMILTON, W. J., & DAY, F. T. (1945). Cleavage stages of the ova of the horse, with notes on ovulation. —*J. Anat.* 79, 127–130. 926

This appears to be the first description of the early cleavage stages of the ova of the horse. The procedure adopted for obtaining the ova was to inseminate the mares when a fairly large follicle (not less than 3.0 cm. diameter) was found to be present in one ovary. All mares, except one, were injected intravenously with 500–1,000 I.U. of "gonan", a lutealizing hormone; frequent rectal examinations were then made to determine the time of ovulation. The mares were killed at definite times after ovulation and the ova obtained by flushing the uterine tubes with Locke's solution.

The authors describe six unsegmented (three living, three degenerating) eggs in their series. In these eggs there was no indication of the formation and separation of the first polar body. The egg of the horse, therefore, appears to be an exception to what has been found in all spontaneously ovulating mammals with the exception of the dog, where separation of the first polar body occurs when the egg is still in the ovary. The authors reject the possibilities that the first polar body had disintegrated or that the administration of lutealizing hormone had prematurely caused ovulation.

Cleavage stages with 2, 3, 4, 5 and 15 blastomeres are described and their approximate ovulation ages are recorded. Cleavage was essentially similar to that of most other mammals, but deutoplasmolysis (yolk elimination) was extensive for a eutherian egg.

—N. J. SCORGIE.

STEVENSON, W. G. (1945). The comparative fertility of mares bred at foal and non-foal heat.—*Canad. J. comp. Med.* 9, 126–130. 927

Observations were made on pure bred Percherons kept under excellent conditions, mares with foals being allowed to graze throughout the summer. During the winter the diet was supplemented with bran, oil cake, vitamin A and D feeding oil, a mixture of iron oxide and bone meal, and salt *ad lib*. Mixed alfalfa and timothy hay supplied the roughage. There was no essential difference in the reproductive efficiencies of mares bred during foal heat and mares bred during non-foal heat. S. concludes that if mares are properly maintained they may be bred with as much safety and efficiency at the foal heat as at non-foal heat.

—R. GWATKIN.

PARSHUTIN, G. V., & SKATKIN, P. N. (1944). Искусственное осеменение и случка лошадей. [Artificial Insemination and mating in horses. A handbook for artificial insemination technicians and horse breeders.] pp. 96. 22 diagrams and photographs. Moscow: Vei'khozgiz. 8vo. 928

Written from a strictly practical stand-point, this book summarizes experiments and results obtained at the Physiological Laboratory of the All-Union Institute for Horse Breeding and the Institute for Artificial Insemination in Livestock.

Chapter 1 outlines the scope and advantages of artificial insemination. 20–30 mares can now be fertilized with the serum produced by a stallion at a

single ejaculation. Chapter 2 deals briefly with the anatomy of the horse's genital organs and Chapter 3 with their physiology in the stallion. Particular attention is paid to factors influencing the viability of the sperm (*e.g.*, the effect of temperature, pH, various chemicals, etc.), and to its normal biology in the body; natural coitus is also discussed.

Next follows a short description of an artificial vagina, constructed of metal and rubber, together with a detailed account of the technique involved and the many precautions to be observed for procuring a successful ejaculation of semen. Chapter 4 describes dilution of the semen, using glucose or sucrose solutions. In Chapter 6 methods for assessing the virility of the stallion are discussed. These include examination of the sexual organs, study of the stallion's behaviour on being brought to a mare in oestrus, examination of his previous breeding record, and tests on the viability of the semen, including its motility, concentration, length of life, percentage of normal sperms, etc.

The next pages deal with stallion management. Instruction is given concerning stabling, exercise and cleanliness, and in particular as to feeding and the measures to be adopted when leading the stallion to the mare for natural coitus, or for obtaining semen. Chapter 8 describes the sexual act and the oestrous cycle in the mare. The correlation between follicular growth, ovulation, hormone activity and oestrus is described in a manner readily understandable by the layman. This leads to a discussion of the external manifestations of "heat", as diagnosed by rectal palpation by intravaginal examination, or by observing the behaviour of a teaser stallion. Four methods for inseminating are described, including a new method evolved in the U.S.S.R., in which the semen is sent out from the insemination centre in glass tubes of 20–30 ml. capacity, each containing one dose. The tubes are tapered at each end and the ends are closed by rubber caps. In use, the caps are removed and one end is attached to the rubber tube of a rubber bulb syringe. The glass tube, held in the right hand and with the forefinger covering the aperture, is guided into the uterus and the semen is expelled by squeezing the rubber bulb with the left hand.

The remaining chapters deal with the storage and transport of semen; the prevention of infections of the mare's genital system; the diagnosis of pregnancy, including methods of determining within one month whether insemination has been successful, symptoms and changes to be looked for in the ensuing months, and finally, the organization of a Soviet artificial insemination centre.—L. LEVENBOOK.

MAYER, D. T., & LASLEY, J. F. (1945). The factor in egg yolk affecting the resistance, storage potentialities, and fertilizing capacity of mammalian spermatozoa. —*J. Anim. Sci.* 4, 261–269. 929

That egg-yolk increased the longevity and maintained the fertilizing capacity of bull spermatozoa in storage by increasing their resistance to adverse environmental conditions was suggested by LASLEY *et al.* (1942) in a preliminary communication. Their subsequent series of publications [see *V.B.* 15, 92, 163 & 369] furnished additional information regarding the resistance of spermatozoa, the effect of egg-yolk and the correlation of resistance with storage and fertilizing capacity. The work indicated that the increased resistance to unfavourable environmental conditions which ejaculated spermatozoa acquire upon the addition of yolk-phosphate buffer must be dependent upon the presence of some factor, or factors, in the egg-yolk.

In the present paper, the authors describe a procedure for the isolation of an active resistance factor

from egg-yolk, which gives a water-clear solution in phosphate buffer and which proved more effective than the original egg-yolk-buffer mixture in increasing the resistance of spermatozoa to adverse conditions. It is shown that the increased effectiveness may be the result of removal of an alcohol-soluble fraction which is detrimental to sperm viability. Some of the chemical characteristics of the active fraction of egg-yolk are described. The authors discuss the possible influence which identification of the factor present in the active fraction may have, not only on the problems of reproductive physiology, but also on those of general cellular physiology.—N. J. SCORGIE.

CONRADI, H. (1943.) Ein Beitrag zur Gelbkörperdiagnose beim Rind. [Diagnosis of persistent corpus luteum in cattle.]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 224-227. 930

While agreeing that the corpus luteum may persist in the bovine ovary if there are abnormal contents in the uterus (e.g., pyometra, macerated foetus), C. nevertheless concludes from a study of living and dead animals that it is doubtful if there often exists a "persistent corpus luteum" responsible for infrequency or absence of oestrus in cattle. He describes the macroscopic appearance of the corpus luteum at various stages of development and regression, relating this to its consistency when felt *per rectum* and to the ease with which it can be expressed or enucleated. He suggests that in most cases cows thought to be showing a persistent corpus luteum and resultant anoestrus, have in fact a normal oestrous cycle, but with almost or completely inapparent external signs (silent heat). He recommends that in these cases, the corpus luteum detected in the ovary should be expressed, thus re-timing the oestrous cycle, to allow of mating on the fourth or 25th-26th day following.—E. COTCHIN.

BAKER, G. A., MEAD, S. W., & REGAN, W. M. (1945.) Effect of inbreeding on the growth curves of height at withers, weight, and heart girth of Holstein females.—*J. Dairy Sci.* 28. 607-610. 931

Employing suitable mathematical and statistical technique the authors demonstrate a significant, proportionate percentage decrease of size in height, weight and heart girth among the daughters of one Holstein bull with increasing coefficient of inbreeding. The degree of inbreeding attained in the daughters in question was considerable.—N. J. SCORGIE.

OTTAWAY, C. W. (1945.) A case of intersexuality (hermaphroditism) in a horned goat.—*Vet. J.* 101. 150-153. 932

O. gives a detailed anatomical description of the genitalia in an intersexual, horned goat. The findings lead him to believe that the animal in question was genetically a male. There are few authentic records of intersexuality in horned goats, and since there is some evidence of a close linkage between the gene for "hornlessness" and the gene for intersexuality, the chief point of interest in the case described arises from the fact that the animal with the intersex condition was a horned goat.—N. J. SCORGIE.

KOGER, M. (1945.) The effectiveness of gonadotropin injections followed by insemination in inducing pregnancy in ewes.—*Endocrinology.* 37. 165-170. 933

One of two ewes injected subcutaneously with 250 rat units of pregnant mare's serum during the anoestrous period and force-bred two days later lambd as a result of treatment. Seven of 46 ewes injected with P.M.S. or pituitary extract during the regular breeding season

and inseminated on the second and/or third day following, lambd as a result of induced ovulation. All the pregnancies occurred in ewes which at the time of insemination exhibited a thin vaginal mucus similar to that of ewes in natural heat, and in view of this observation an attempt was made to simulate more closely the condition of the reproductive tract in natural oestrus by the injection of an oestrogen. Four of 14 ewes injected with 5.0 mg. stilboestrol when oestrus was not expected showed vaginal mucus resembling that of ewes in natural heat 2-3 days after injection; one ewe was receptive to the ram but none conceived from insemination on the second and third days. Eight of 14 ewes given simultaneous injections of P.M.S. and stilboestrol showed a thin vaginal mucus after 2-3 days and three of these conceived to insemination. The natural rhythm of the dioestrous cycle was not altered by the hormone treatments.—N. J. SCORGIE.

DOUGHERTY, T. F., & WHITE, A. (1945.) Functional alterations in lymphoid tissues induced by adrenal cortical secretion.—*Amer. J. Anat.* 77. 81-116. 934

The authors have previously brought forward evidence suggesting that the rate of release of antibody protein from lymphocytes is under pituitary-adrenal control and that increased amounts of protein can be detected in the blood when the lymphoid tissues undergo profound histological changes.

The present investigation shows that in mice and rabbits the following changes take place in lymphoid tissue after a single subcutaneous injection of pituitary adrenotropic hormone or of various adrenal cortical preparations:—(1) degenerative changes, occurring within an hour of the injection and characterized by pyknosis of the medium and small lymphocytes, shedding of cytoplasm of lymphocytes, oedema of all lymphatic structures and cessation of mitosis; (2) repair changes, in which reticulo-endothelial cells become particularly active after six hours, there is phagocytosis of nuclear remnants and large numbers of histiocytes develop and (3) recovery changes which begin after nine hours and in which the lymphoid tissue in mice is again normal within 24 hours; mitoses of surviving lymphocytes, maturation of reticular lymphocytes and differentiation of reticular lymphocytes from reticular cells occur. These changes in lymphoid tissue do not occur in adrenalectomized animals, indicating that the pituitary hormone acts through the adrenal cortex.

It is suggested that a great variety of stimuli which increase pituitary-adrenal cortical secretion produce the "accidental involution" of lymphoid tissue as invoked experimentally and result in increased release into the blood of gamma globulin, with which antibody is associated, by dissolution of the cytoplasm of lymphocytes. Liberation of serum gamma globulin in the normal animal and antibody protein in the immunized animal and the increased activation of r.e. cells following adrenal cortical stimulation throws light on the integration of the role of lymphocytes, r.e. cells and the adrenal cortex in the normal and pathological physiology of the subject.—E. G. WHITE.

COLE, H. H., HART, G. H., & MILLER, R. F. (1945.) Studies on the hormonal control of estrous phenomena in the anestrus ewe.—*Endocrinology.* 36. 370-380. 935

Ewes of the mutton breeds were employed in studies relating to the induction of oestrus in anoestrous ewes. Eight of 118 ewes receiving a single injection of 600-750 I.U. of pregnant mare's serum came into

oestrus within ten days; all were bred, but none became pregnant. None of 18 ewes force-bred 72-96 hours after a single injection of 300 I.U. became pregnant. Fifty-eight of 170 ewes given two injections of P.M.S. (125-750 I.U.) at 17-day intervals came into oestrus, but only 17 of 53 which were mated became pregnant. Six of 43 ewes receiving three injections came into oestrus and mated; only two became pregnant. [If a ewe came into heat after the first injection she was not given a second injection; similarly ewes coming into oestrus after the second injection were not given a third. Thus, ewes receiving three injections were the most refractory.] The low fertility in these experiments is believed to have been related to overdosage in some instances. Superovulation was produced with 600-750 I.U. of P.M.S. Oestrogen in doses large enough to induce sexual receptivity, *i.e.*, over 400 R.U., given either alone or as a series of injections prior to P.M.S. inhibited ovarian activity. Sixteen of 48 ewes receiving P.M.S. supplemented with progesterone came into oestrus, as compared with six of 22 receiving P.M.S. alone. When two injections of both hormones were made, five of nine mated as compared to one of six receiving only P.M.S. The authors conclude that these experiments provide little evidence of synergistic action of either oestrogen or progesterone in inducing sexual receptivity in the ewe.

Combined treatment with doses from 37.5 to 100 mg. of testosterone propionate and 300-400 I.U. of P.M.S. was a highly effective means of inducing oestrus in the ewe, but the percentage of fertile matings was apparently reduced by the androgen. Following treatment with androgen, an unusual tendency of ewes in oestrus to manifest homosexual behaviour was observed.

The authors conclude from the experiments reported here that, although oestrus was induced by several methods, a complete physiological response was not produced regularly. It would appear, therefore, that either a proper balance of hormones was not attained, or unknown factors are involved.—N. J. S.

DAVIDSON, J. N. (1945.) Humoral aspects of wound-healing.—*Brit. med. Bull.* 3, 73-76. 936

D. reviews the literature on the humoral aspect of the healing of incised wounds, more especially of the third phase of proliferation, fibrous tissue formation, contraction and epidermalization.

Protein material is lost from a wound from direct tissue destruction, by exudation of plasma and through excretion in the urine; this loss is especially severe in burns. "A high protein diet hastens fibroplasia but does not influence the earlier stages of healing. A high local pH may be an aid to healing. Vitamin C deficiency delays healing because the cells fail to produce collagen. Vitamin A and possibly D hasten healing by stimulating epithelial regeneration. Pituitary and steroid hormones do not influence repair, but in rats fed thyroid extract there was an 11% reduction of the healing time and a 22% reduction when it was administered before wounding; when 2:4 dinitrophenol was fed there was a 15-27% reduction."

Enzymes are of doubtful benefit but the administration of phosphatase together with calcium glycerophosphate hastens the repair of fractures. Substances released by damaged tissues are believed to have an influence on the speed of wound healing; these may be true secretions or simply breakdown products resulting from cell destruction. They are most abundant

during the phase of rapid cell proliferation, a factor which has a bearing on the more rapid healing of secondary wounds, often noticed clinically. Embryo extracts have little or no influence on the speed of wound healing and D. concludes by stating that at the moment no attempt should be made to accelerate the healing of a wound which is healing under normal conditions.

—R. M. ARNOLD.

MEDAWAR, P. B. (1945.) Biological aspects of the repair process.—*Brit. med. Bull.* 3, 70-73. 937

M. reviews the literature on wound healing, as considered from a biological viewpoint beginning with a discussion of the importance of cellular migration in the healing of wounds. This first stage of repair precedes cell division and is one in which all embryological cell layers participate, especially the epithelium, where mass migration of epithelial sheets can occur. The latent period before true repair commences varies with the type of tissue affected; in the case of skin wounds it lasts until the collagen fibres traversing the wound have formed a union of adequate mechanical strength. Attempts to lay down mathematical formulae for the rate of repair of wounds have so far failed but the general shape of the repair curve can be defined.

M. then considers the relationship between regeneration, asexual reproduction and monozygotic twinning. He points out that the latter is a type of asexual reproduction confined to the embryo stage and which can be considered to operate in Mammalia, being normal in the nine-banded armadillo. In view of this, the distinction between "regulation" and "non-regulation" eggs no longer seems significant and there is no correlation between the production of eggs capable of "regulation" and asexual reproduction in the adult.

In the case of adult mammals the power of asexual reproduction is lost and most cells involved in repair processes are lineal descendants of cells of the same histological type. It seems probable that all the somatic cells of any individual have the same complement of nuclear genes but that only some of these are operative once a cell has reached a certain stage of differentiation. The existence of cytoplasmic genes is debated; they probably exist in lower organisms and perhaps also in the secretory cells of higher animals.—R. M. ARNOLD.

ABBOTT, W. E., HIRSHFELD, J. W., & MEYER, F. L. (1945.) Metabolic alterations following thermal burns. II. Changes in the plasma volume and plasma protein in the convalescent phase.—*Surg. Gynec. Obstet.* 81, 25-30. [Abst. in *Bull. War. Med.* 6, 126, copied verbatim. Signed: G. R. CAMERON.] 938

Dogs burned severely (20 per cent. body surface, second or third degree burns) and maintained on an intake of food identical with that consumed before burning, show a definite rise above normal in their plasma volumes after the "shock" phase. This persists for 40 to 90 days, and is accompanied by an increase in the "available fluid" volume as measured by the thiocyanate method. Oedema of the extremities occurred in two animals, but was not perceptible in another two. The circulating red cell mass decreased, so that anaemia was present in the convalescent period.

The authors conclude that since a state of overhydration develops during convalescence under these conditions, it is not advisable to give excessive quantities of fluid at that time. Adequate urinary output should be maintained and diuresis encouraged.

POISONS AND POISONING

- I. ROSENBERGER, G. (1943.) Kohlanämie des Rindes. [Anaemia of cattle due to marrow-stem kale.]—*Dtsch. tierärztl. Wschr.* 51. 63-67. 939

- II. COHRS, P. (1943.) Sektionsbefund und Pathogenese der Kohlanämie des Rindes. [Pathology of anaemia of cattle due to a diet of marrow-stem kale.]—*Ibid.* 67-69. 940

I. An account is given of the ill-effects which result from the ingestion for a prolonged period by cattle of large amounts (40-50 kg. per animal per day) of marrow-stem kale (*Brassica oleracea*) either fresh or ensilaged. Haemoglobinuria is frequently the first and most striking symptom and occurs within 8-10 days after the commencement of feeding; it is accompanied by a hyperchromic anaemia. The animals rapidly lose weight and exhibit an unsteady gait. Cows which are pregnant or have a high milk yield are most severely affected: in the latter, the yield is greatly reduced. There is also evidence that the fertility of breeding animals is impaired. When the kale is removed from the diet a rapid improvement in the condition of the animals takes place, provided the damage already done is not too severe. The nature of the harmful factor is as yet unknown. It is recommended that for milch cows and breeding animals not more than 15 kg. of kale per animal daily should be fed if the feeding period is prolonged. For a short time (8-14 days) double this amount may be given without harmful effects. For fattening animals, 15-20 kg. may be fed over a considerable period.

II. In an animal which had died of the anaemia produced by consumption of marrow-stem kale, the following pathological changes were observed: a general anaemia, haemoglobinuria, haemoglobinuria, slight general jaundice and a haemolytic necrosis of the liver lobules. There was also a slight hyperaemic, hyperplastic swelling of the spleen. Haemorrhages in the trachea and bronchial tubes and degeneration of the heart muscles were observed. The primary action of the harmful agent present in the plant is to cause haemolysis and all other changes are the result of this. The main cause of death is liver insufficiency. The findings show a close similarity to those observed in puerperal haemoglobinuria. Further investigations are required before a differential diagnosis can be made on the basis of P.M. findings.—E. M. CRUICKSHANK.

- *KNÖBEL, P. (1943.) Ueber die Schädlichkeit von Ammoniumsalzen für Hühner. [The danger to

poultry of ammoniacal fertilizers.]—*Inaug. Diss. Hannover*. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 133.] 941

In tests made of the effect of feeding certain artificial fertilizers to poultry, it was found that fertilizers which were mixtures of potassium and ammonium nitrates, ammonium sulphate and nitre, calcium carbonate and ammonium nitrate (nitro-chalk) would cause illness; that poultry should be kept from fields on which they have been used until the fertilizers have had time to become dissipated. Ammonium sulphate, ammonium chloride, and a mixture of calcium carbonate and ammonium chloride are harmless to poultry when evenly spread in the manner in which fertilizers are used.—RACHEL MARSHALL.

- WEIGHTON, C. (1944.) Arsenic poisoning in cattle.—*Vet. J.* 100. 126-127. 942

As a result of drinking from a trough containing an arsenical sheep dip, eight of 35 store cattle died, seven within five days and one 21 days after drinking the dip; eight of the remaining bullocks showed symptoms of poisoning. Sweating appeared in practically every case in the latter part of the illness; the temperatures were normal or within one degree of normal. Treatment consisted primarily of administration of ferric oxide. Analysis of liver and abomasum contents indicated 1/85th grain and 1/50th grain of As per oz. respectively.—R. ALLCROFT.

- CAMERON, J. D., & EDGE, J. R. (1945.) Agranulocytosis after sulphonamide sensitization; penicillin therapy: death from *Ps. pyocyanea* septicaemia.—*Brit. med. J.* Nov. 17th. 688-689. 943

A man suffering from a gunshot wound was treated with sulphanilamide and sulphadiazine over a period of three days with no ill-effects. Two months later he developed tonsillitis and was given sulphathiazole for four days. Two days later the gunshot wound was sloughing and he was given sulphapyridine; this was discontinued after two days' treatment as the patient developed fever, pallor and neutropenia. Pentnucleotide and penicillin therapy was then used. The penicillin controlled the staphylococcal infection but *Pseudomonas pyocyanea* which was also present invaded the blood stream and the patient died. The authors suggest that the first treatment with sulphonamides had sensitized the patient and accounted for the agranulocytosis which developed when treatment was repeated after an interval of two months.—E. BOYLAND.

See also absts. 966-969 (arsenical poisoning).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

- SANDERS, D. W., WEATHERWAX, P., & McCLUNG, L. S. (1945.) Antibacterial substances from plants collected in Indiana.—*J. Bact.* 49. 611-615. 944

The antibacterial action of the press juice from 120 species of plants was tested by the Oxford cup technique. About a tenth of the samples tested against *Bacillus subtilis* and *Bacterium coli* had some activity but none had great activity. Some extracts stimulated bacterial growth.—E. BOYLAND.

- LAWRENCE, C. A. (1945.) Effects of enzyme preparations upon penicillin. I. A method for testing penicillin for sterility. II. Agents responsible for penicillin inactivation.—*J. Bact.* 49. 47-55 & 57-63. 945

I. In testing penicillin for sterility it is advisable to inactivate the antibiotic substance first. This can

be readily carried out with taka-diastase or clarase (both from *Aspergillus oryzae*) or with a preparation from *Bacillus mesentericus*. Most diastatic and proteolytic enzymes have no action on penicillin. Clarase is recommended for use in penicillin sterility tests.

II. Many preparations of penicillin contain living bacteria often of the *B. subtilis* and *B. mesentericus* groups. Penicillinase action appears to be very rapid.—E. BOYLAND.

- WOODRUFF, H. B., & FOSTER, J. W. (1945.) Microbiological aspects of penicillin. VII. Bacterial penicillinase.—*J. Bact.* 49. 7-17. [For part VI, see *V.B.* 15. 58.] 946

- FOSTER, J. W., & KAROW, E. O. (1945.) Microbiological aspects of penicillin. VIII. Penicillin from different fungi.—*Ibid.* 19-29. 947

VII. Many bacteria, yeasts and fungi destroy penicillin by the action of the penicillinase they contain. Aerobic spore-forming bacteria and actinomycetes are the most active penicillin destroyers. Penicillinase is not formed by bacteria growing in acid media below pH 5.6. It is destroyed by heating to 50°C. or by standing at pH 2.5. The optimum pH for the action is 7.0-7.5. Penicillinase is inhibited by sodium azide, iodoacetic acid or ferrous chloride.

VIII. Substances identical with or similar to penicillin are present in culture filtrates of *Aspergillus niger* Y.W., *A. nidulans*, *A. oryzae* T.P., *A. flavipes* and *Penicillium citreo-roseum*. This was demonstrated by comparative action on 18 bacterial species, by lability to penicillinase and by physical properties. The different moulds had different optimum conditions both for growth and for penicillin production.—E. BOYLAND.

TIMONIN, M. I., & ROUATT, J. W. (1944.) Production of citrinin by *Aspergillus* sp. of the *Candidus* group.—*Canad. J. publ. Hlth.* 35. 80-88. 948

The authors found that a fungus (*Aspergillus* sp. of the *Candidus* group) isolated from cattle feed was capable of producing citrinin when grown on synthetic media containing glucose. The purified citrinin was similar in chemical composition to that derived from *Penicillium citrinum*. While good growth of the fungus was obtained on various "sugars", citrinin was produced only in media containing glucose, fructose, sucrose, maltose and honey. Other facts found in this study were that NaNO₃ was the source of nitrogen giving the best yield, that iron plus zinc provided the best source of heavy metals, that the times of incubation for the maximum production of citrinin varied with the temperature, viz. at 37-40°C. maximum yield was obtained in 21 days, at 26-30°C. 28 days or more, and that different isolates, while morphologically identical, differed greatly in citrinin-producing ability.—J. L. B.

SEVAG, M. G., SHELBURNE, M., & MUDD, S. (1945.) Studies on the action of sulfonamides on the respiration and growth of bacteria. A. Factors controlling the inhibition by sulfonamides of carboxylases. I. Antagonism between cocarboxylase and sulfathiazole.—*J. Bact.* 49. 65-70. 949

SEVAG, M. G., HENRY, J., & RICHARDSON, R. A. (1945.) Studies on the action of sulfonamides on the respiration and growth of bacteria. A. Factors controlling the inhibition by sulfonamides of carboxylases. II. Antagonism between *p*-aminobenzoyl acid and sulfathiazole. III. Antagonism between neoptone and serum proteins and sulfonamides. B. Factors influencing the correlation of the inhibition of respiration with the inhibition of growth of *Escherichia coli*, *Pneumococcus*, type I, and *Staphylococcus aureus*. I. The interference of the evolution of hydrogen with the measurement of the inhibition of oxygen consumption in *Escherichia coli*. II. Effect of serum on the inhibition of respiration and growth of *Pneumococcus*, type I, and *Staphylococcus aureus* by sulfonamides and *p*-aminobenzoyl acid.—*Ibid.* 71-77, 79-84, 129-138 & 139-147. 950

A. I. Sulphathiazole inhibits carboxylase in whole yeast, but one molecule of cocarboxylase can counteract the inhibitory action of 8-53 thousand molecules of sulphathiazole. Cocarboxylase can be removed from yeast by washing with alkaline phosphate solution, so that all carboxylase activity is reversibly removed. Sulphathiazole and cocarboxylase compete for the specific carboxylase protein and in this washed system one molecule of cocarboxylase counteracts the inhibiting effect of 300-600 molecules of sulphathiazole. Sulphathiazole also competitively inhibits the carboxylase of *Staphylococcus aureus*.

A. II. Sodium pyruvate and sulphathiazole compete for the active site of carboxylase and inhibition depends upon sulphathiazole getting to the enzyme first. *p*-Aminobenzoyl acid does not reverse the inhibition of carboxylase by acetaldehyde but does reverse the inhibition of *Bacterium coli* or *Staph. aureus* carboxylase by sulphathiazole. Both the neutralization of carboxylase inhibition and growth inhibition require the same ratios of sulphathiazole to *p*-aminobenzoyl acid. It is suggested that *p*-aminobenzoyl acid acts as catalyst inhibitor rather than as a catalyst.

A. III. Carboxylase of *Bact. coli* is inhibited by *o*-, *m*- and *p*-aminobenzene sulphonamides, by human α and β globulins and by *p*-aminobenzoyl acid. The inhibition by sulphonamides and globulins but not by *p*-aminobenzoyl acid is neutralized by neoptone. Human serum albumin neutralized the inhibition of *o*- and *m*-aminobenzene sulphonamides but not the inhibition by sulphanilamide or *p*-aminobenzoyl acid. The foreign proteins appear to combine with the enzyme or the drug and neutralize the sulphonamide.

B. I. *Bact. coli* produces hydrogen from formic acid even in the presence of oxygen, so that it is difficult to get true values for the respiration of the organism. Both growth and oxygen consumption were inhibited by sulphonamides.

B. II. The growth of *Pneumococcus* type I but not of *Staphylococcus aureus* on glucose and yeast extract media was inhibited by *p*-aminobenzoyl acid or by the three isomeric (*o*-, *m*- and *p*-) sulphanilamides. The inhibition of pneumococcal growth was neutralized by serum. Sulphanilamide and sulphathiazole inhibited the growth of staphylococci on a vitamin-free casein hydrolysate, and this inhibition was counteracted by serum. The results showing how the action of sulphonamides is dependent on the proteins present in the medium indicate that the proteins compete with the bacterial enzymes for the drugs.—E. BOYLAND.

GOETCHUIS, G. R., & LAWRENCE, C. A. (1945.) A series of new sulfonamides which are unaffected by *p*-aminobenzoyl acid.—*J. Bact.* 49. 575-584. 951

A number of halogenated aromatic amine derivatives were tested for antibacterial effects *in vitro*. Compounds such as sulphanilyl 3.5 dibromanilide were generally more effective than compounds with only one halogen substituent in inhibiting pneumococci, streptococci, or gonococci. The bacteriostatic action of sulphanilyl anilides is not neutralized by *p*-aminobenzoyl acid.—E. BOYLAND.

BORELL, U., & TROELL, L. (1943.) A contribution to the knowledge of the mode of action of sulfathiazole in the organism and its relation to the reticulo-endothelial system.—*Acta med. scand.* 115. 587-604. [In English.] 952

Massive intraperitoneal dosage of sulphathiazole did not influence the number of trypanblue granules found in the cells of the reticulo-endothelial system of g. pigs after the intraperitoneal injection of 1.5 ml. of 2% trypanblue. Some slight increase in the number of granules was, however, found in the macrophages of the omentum. B. concludes that sulphathiazole may possibly stimulate the r.e.s. to increased bacterial phagocytosis and that even when administered in massive doses, it certainly does not decrease its phagocytic powers.—A. B. PATERSON.

JAQUETTE, D. S., KLECKNER, A. L., & KLEIN, L. A. (1945.) Sulfapyridine in the treatment of bovine mastitis and its effect on mastitis streptococci and staphylococci.—*Vet. Ext. Quart. Univ. Pa.* No. 99. pp. 3-7. 953

Twenty-four cases of mastitis were treated with sulphapyridine at the rate of 5 or 6 g. per 100 lb. body

weight, administered as a drench suspended in water.

Of 12 cases of latent infection, four infected with *Streptococcus agalactiae* were freed of infection. Of five cases of chronic catarrhal mastitis, two were freed of infection, but symptoms disappeared in all five. Of seven cases of parenchymatous mastitis, three recovered clinically but remained infected. Two quarters only were cleared of infection. In all these groups, 34 quarters were infected with *Str. agalactiae*. Ten of these were cleared of infection. Eight quarters infected with *Str. dysgalactiae* were freed of infection.

The treatment had no effect on pathogenic staphylococci in the udder.

The appearance of toxic symptoms in seven cows combined with the indifferent results obtained in the others would appear to preclude the use of this drug from any elimination scheme.—R. M. LOOSMORE.

MURPHY, J. M., & PFAU, K. O. (1945.) The value of local injections of penicillin sodium in the treatment of *Streptococcus agalactiae* infection and mastitis in cows.—*Cornell Vet.* 35, 88-103. 954

By injecting penicillin sodium in boiled distilled water locally into the mammary gland, the authors assayed the optimum dose and number of doses required to cure mastitis.

Out of 15 quarters in five cows receiving a single dose of 5-200 thousand units in 50-300 ml. of water, five quarters were cured; retreatment of the others after four weeks failed to produce a cure. Out of ten quarters in four cows receiving ten thousand units at five successive milkings, six of the quarters were cured.

In 13 cows receiving 20 thousand units at five successive milkings, all 32 infected quarters were freed of infection.

In all the cured quarters, the cure was independent of period in lactation, induration, duration of infection or abnormality of the milk. In the dosages used penicillin caused no damage to the udder. A transient change in the macroscopic appearance of the milk was observed during treatment, but there was no drop in the milk yield.—R. M. LOOSMORE.

JOHNSON, S. D. (1945.) Permanently drying off diseased quarters.—*Cornell Vet.* 35, 158-166. 955

This report deals particularly with udder quarters not responding to treatment. Valuable dairy cows with a single diseased quarter may be salvaged for dairy purposes as three-quarter cows by permanently drying off the diseased quarter. Secretion may be dried off by the injection of 30-60 ml. of a 3% silver nitrate solution, the treated quarter being stripped out after 10-14 days. One infusion is usually sufficient when the cow is dry. If the quarter is still secreting after 14 days, treatment should be repeated. 2-3 months should be allowed for the complete drying off of quarters. Treated quarters may swell and the animal show inappetence for one or two feeds. No attempt should be made to dry off a cow with an acute mastitis or within 2-3 weeks after it has abated; in the case of septic mastitis this period should be extended to 3-4 weeks. When quarters continue to secrete after repeated injections, amputation of the teat is recommended. Secretion from accessory teats may cease after the injection of 5% silver nitrate solution or 5% silver oxide in oil. A 1:500 to 1:2,000 aqueous neutral acriflavine solution or vaporization of 3-4 oz. of ether into the udder proved effective in drying off infected quarters.—H. I. FIELD.

THOMAS, A. R., JR., & LEVINE, M. (1945.) Some effects of penicillin on intestinal bacteria.—*J. Bact.* 49, 623-627. 956

Although Gram-negative organisms are not in-

hibited by penicillin in concentrations obtainable in the blood, many are highly susceptible in concentrations which can be attained in the urine or bile or by local irrigation. This experiment was designed to find the concentration required *in vitro* for the inhibition of Gram-negative intestinal bacteria. The susceptibility of the commoner Gram-negative organisms descends in the following order: *Salmonella* and *Eberthella*, *Proteus*, *Shigella*, *Escherichia*, and *Aerobacter*. With the exception of one strain of *Aerobacter*, all were inhibited at a concentration of 100 Oxford units per ml., a concentration easily reached in the urine. This would seem to indicate a therapeutic use for penicillin in infections of the urinary tract associated with these organisms.

Involution forms and changes in cultural characters were noticed in these organisms when growing in inhibitory but not bacteriostatic concentrations of penicillin.—R. M. LOOSMORE.

REILLY, H. C., SCHATZ, A., & WAKSMAN, S. A. (1945.) Antifungal properties of antibiotic substances.—*J. Bact.* 49, 585-594. 957

Seven antibiotics were tested against fungi. Actinomycin was active but too toxic for practical application. Gliotoxin and streptothricin are both worth consideration for practical utilization. Some synthetic substances such as acrylophenone and benzalacetophenone have considerable fungistatic action.

—E. BOYLAND.

SCHELLHASE. (1944.) Aktinomykose und Reiztherapie. [Actinomycosis and "non-specific stimulus" therapy].—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* June 9th, 187-188. 958

One dose of "yatren" or "tromsuln" (both containing iodine) was sufficient to heal most cases of tongue or skin actinobacillosis. Since a similar result was obtained with "sufrogel" (a 0.3% suspension of sulphur in gelatin), S. concludes that the action of iodine in actinobacillosis is not specific, but an example of a "non-specific stimulus" therapeutic action.—E. C.

BUTLER, E. C. B. (1945.) Cervico-facial actinomycosis. Penicillin therapy.—*Proc. R. Soc. Med.* 38, 481-482. 959

Some strains of *Actinomyces* are penicillin-sensitive; some react to propanidine and some to gentian violet. A case is reported in a woman in whom an actinomycotic lesion of the lower jaw responded rapidly to systemic treatment with penicillin. Potassium iodide treatment has now been replaced by systemic penicillin, or local application of propanidine or gentian-violet, according to the strain of *Actinomyces* isolated.—R. M. LOOSMORE.

HETZEL, E. (1942.) Zum 25 jährigen Gedächtnis der Schaffung des "Bayer 205" (Germanin, Naganol) zur spezifischen Behandlung der Trypanosomen-Krankheiten. [25 years' experience of the use of Bayer 205 (germanin, naganol) for trypanosomiasis].—*Dtsch. tierärztl. Wschr.* 50, 498-499. 960

Bayer 205 (antrypol) was first produced in 1917, and used in practice for human sleeping sickness in 1921. In veterinary work it has proved valuable for the treatment of infections due to *Trypanosoma brucei*, *T. evansi*, *T. equinum* and *T. equiperdum*, being particularly efficacious when used in the early stages of infection. It can be used as a prophylactic, and this property has proved particularly valuable in the control of mal de caderas [*T. equinum* infection] against which, it is claimed, it gives protection for 6-8 weeks. For the treatment of this disease it is recommended to use the drug dissolved in atimosan solution. [No information is given as to dosage or toxicity].—U. F. RICHARDSON.

SMITH, H. C., & HOWELL, D. E. (1945.) Blood transfusion as a treatment for anaplasmosis.—*Vet. Med.* 40. 228-230. 961

Blood from healthy cattle was drawn into flasks containing a mixture of 3% sodium citrate, 50% glucose and 2% sodium sulphathiazole, the glucose being added to protect the blood cells from injury and the sodium sulphathiazole to prevent bacterial growth. 50 ml. of the mixture was sufficient to preserve 450 ml. of blood. Eighteen cows with anaplasmosis were given transfusions of 2,000-3,000 ml. Only three animals died, and eliminating the moribund cases, it is claimed that this gives a recovery rate of 93.75%, thus confirming that blood transfusion is a definite aid to recovery.

—U. F. RICHARDSON.

*FERRARO, F. (1942.) Anzione dei sulfamidici su alcuni elminti. [Action of sulphonamides on certain helminths].—*Ann. Igiene (spec.)*. 52. 445-451. [Abst. from abst. in *Jber. Vet.-Med.* 71. 251-252.] 962

F. found that the larvae of "*Anchyllostomum equinum*" [*Ancylostoma caninum* or *Strongylus equinus*] were killed by a 20% solution of sulphapyridine or sulphamethylthiazole in one hour. In a 2% or 10% solution of either drug they were killed in six hours. In 0.1-1.0% solution the drugs had a stimulant effect on the larvae. On the vinegar eelworm, *Anguillulina aceti*, sulphamethylthiazole was equally effective, but sulphapyridine at a concentration of 2% failed to kill in 48 hours.—J. F. A. SPRENT.

HONESS, R. F. (1940.) A preliminary report of the effect of X-ray on trichinosis in the rat.—*J. Colo. Wyo. Acad. Sci.* 2. No. 6. 44. 963

Three groups of rats were used in the experiment. The first group served as controls, the second consisted of rats treated by X-rays after infestation and the third of rats fed trichinae which had previously been treated with X-rays.

Each rat was fed 150 trichinae and killed after 30 days; the diaphragms were then removed and the encysted trichinae were counted. In the second group 800 r. caused a reduction in the number of trichinae of about 26%; in the third group 800 r. caused a reduction of nearly 85%.—S. M. G.

MORGAN, A. F., & GROODY, M. (1944.) Running fits prevented and cured by raw protein.—*J. Amer. vet. med. Ass.* 105. 406-408. 964

A commercially manufactured heated cereal dog food containing 20% protein produced fits in a young dog within five days when fed alone. Thiamine, choline and pyridoxine were ineffective in preventing the fits. On changing to a stock diet containing 36% milk protein, symptoms ceased and rapid growth occurred, but on a return to the original diet, fits recommenced almost at once. The administration daily of 20 g. of crude raw acid-precipitated dried casein produced an immediate cure but 5 g. daily of an acid-washed dried casein of a lower biological value was only partly protective. The total serum protein and serum albumen increased after the casein treatment. In a further experiment with a manufactured food containing a non-heated-treated meat meal constituent two out of three dogs developed fits. Both responded to casein. It is concluded that "fright disease" produced by certain heat-treated cereal foods may be due to amino-acid deficiencies.—H. I. FIELD.

WILLMAN, J. P., LOOSLI, J. K., ASDELL, S. A., MORRISON, F. B., & OLAFSON, P. (1945.) Prevention and cure of muscular stiffness ("stiff-lamb" disease) in lambs.—*J. Anim. Sci.* 4. 128-132. 965

"Stiff-lamb" disease is an ailment of young lambs, characterized by muscular stiffness due to lesions in any

part of the muscular system of the body. A high incidence of the disease follows the feeding of pregnant ewes a diet comprising lucerne and beans, with or without supplements of barley and oats, but the incorporation in the ration of wheat bran or wheat germ is effective in preventing the condition.

Experiments are reported in which vitamin E supplements given to the ewes before and after parturition prevented any serious incidence of the disease; a high proportion of cures in affected lambs was obtained by feeding them with *d, l, α*-tocopherol in cottonseed oil solution or by subcutaneous injections of an aqueous solution containing 100 mg. of the Na salt of the *d, l, α*-tocopherol phosphoric acid ester. Although the condition of vitamin E deficiency was not definitely substantiated in the aetiology of the disease, the prophylactic and curative action of vitamin E supplements is probably not without significance.—A. EDEN.

SANDGROUND, J. H., & HAMILTON, C. R. (1943).

Studies on the detoxication of organic arsenical compounds. IV. The protective action of *p*-aminobenzoic acid against lethal doses of neoarsphenamine without inhibition of trypanocidal potency.—*J. Lab. clin. Med.* 28. 1821-1827. [For previous parts see *V. B.* 14. 39.] 966

SANDGROUND, J. H. (1944.) Studies on the detoxication of organic arsenical compounds. V. Additional detoxicants for pentavalent arsenicals.—*J. Pharmacol.* 80. 393-398. 967

IV. The mortality rate in rats infected with *Trypanosoma equiperdum* was considerably reduced when *p*-aminobenzoic acid was administered intraperitoneally or orally at the same time as, or 15 min. before the intravenous or subcutaneous injection of high (approaching the maximum tolerance level) doses of neoarsphenamine. No inhibition of the trypanocidal potency of the neoarsphenamine was observed.

It appeared that *p*-aminobenzoic acid had no detoxifying effect against manganic arsenous acid, the arsenoxide "mapharsen", the arsenobenzene "arsphenamine" or the trivalent organic antimonial tartar emetic.

V. Further investigation showed that many aromatic compounds have the property of detoxicating pentavalent arsenicals. In addition to the three isomeric forms of aminobenzoic acid, the nitro- and hydroxy-analogues, as well as other substituted compounds which are not *per se* highly toxic to the rat, were found to give a high order of protection when administered at the same time or 5-15 min. before injection of the arsenical compound.

Since it was found that benzoic, phenyl acetic, and phenyl propionic acids were all highly effective it appears that a high degree of structural similarity between detoxicant and toxicant is not an essential feature of the detoxication phenomenon.—R. ALLCROFT.

I. MCCHESENEY, E. W., BARLOW, O. W., & KLINCK, G. H., JUNR. (1944.) The detoxication of neoarsphenamine by means of various organic acids.—*J. Pharmacol.* 80. 81-92. 968

II. MCCHESENEY, E. W. (1945.) Further studies on the detoxication of the arsenphenamines by ascorbic acid.—*Ibid.* 84. 222-235. 969

I. The effects of various organic acids on the toxicity of neoarsphenamine for rats showed that ascorbic, isoascorbic, *d*-glucoascorbic and *p*-aminobenzoic acids materially reduced the toxicity while lactic, pyruvic, succinic, malic, mandelic, aspartic and gluconic acids and *L*-cysteine had no effect. The amount of acid required to exert this protective effect was between one-eighth and one-quarter of the weight of the arsenical or about 0.5 mole of ascorbic acid for one mole of neoarsphenamine.

Maximum protection was obtained when the neoarsphenamine and acid were injected intravenously in the same solution but some protection was obtained if the acid was injected simultaneously at another site.

Histological examination showed that the usual pathological changes which occur after toxic doses of neoarsphenamine were absent when ascorbic acid was injected with the arsenical; it was also found that there was no significant change in the excretion of As nor any significant difference in the As content of liver or kidney between animals injected with neoarsphenamine and ascorbic acid and controls injected with the arsenical only.

It is suggested that the function of the ascorbic acid is primarily that of preventing oxidation, chiefly after injection.

II. Studies on the *in vitro* and *in vivo* behaviour of solutions of arsenicals with and without ascorbic acid indicated that ascorbic acid administered with an arsenical decreases the oxidation-reduction potential of the blood sufficiently to prevent immediate oxidation of the arsenical. The *in vivo* experiments suggested that the blood rather than the liver and kidneys is the site of the detoxication process and that a high blood concentration of ascorbic acid is necessary during the time the neoarsphenamine is in the circulation if the detoxifying effect is to be observed.

A method for the analysis of a mixture containing neoarsphenamine, arsenoxide and ascorbic acid is described.—R. ALLCROFT.

BLOUNT, W. P. (1945.) Sulphathiazole (M & B 760) as an aid to healing in the horse.—*J. R. Army vet. Cps.* 16. 235-236. 970

A clinical article, pointing out in very general terms, the value of sulphathiazole powder as an aid to healing superficial wounds, either traumatic or surgical, in the horse. Provided it is applied early, clipping of hair or extensive cleaning up of the wound is not required.

—R. M. ARNOLD.

SPOTTS, S. D., & DAVIS, J. B. (1945.) Allantoin-sulphanilamide ointment in surgery.—*Amer. J. Surg.* 69. 4-8. [Abst. in *Bull. War Med.* 6. 124, copied *verbatim*. Signed: J. N. DAVIDSON.] 971

The authors describe the use of ointment containing sulphanilamide, to control infection, and allantoin, to stimulate the formation of healthy granulations, in the treatment of wounds. The ointment contained sulphanilamide 10 per cent and allantoin 2 per cent in a non-greasy water-miscible base containing glycerin, triethanolamine, stearic acid and water, as described by VEAL and KLEPSE. After thorough "débridement", a liberal amount of the ointment was applied to the wound, which was covered with vaseline gauze and a dry dressing. The first dressing was changed after 5 days, and fresh ointment was subsequently applied at 3-day intervals. Treated wounds produced an unusual amount of exudate.

This method of therapy was successfully applied to more than 100 cases, including "traumatic wounds, leg ulcers, decubitus ulcers, postoperative wounds with infection, frostbite, infected burns and carbuncles". Four case histories are presented.

TRAUB, E. F., NEWHALL, C. A., & FULLER, J. R. (1944.) The value of a new compound used in soap to reduce the bacterial flora of the human skin.—*Surg. Gynec. Obstet.* 79. 205-216. [Abst. in *Bull. Hyg., Lond.* 20. 40, copied *verbatim*. Signed: L. P. GARROD.] 972

This paper describes the effects of using soap containing 2 per cent. of 2,2'-dihydroxy-3, 5, 6-3', 5', 6'-hexachloro-diphenyl-methane. This substance has

marked bactericidal and bacteriostatic powers, particularly against Gram-positive organisms, and retains its activity when embodied in soap, even in the presence of free alkali. Studies of skin disinfection were made by a modification of the elaborate method devised by PRICE [V. B. 11. 270], which consists of washing the hands by a standard method for an exact time in a series of basins and enumerating the bacteria in the water from each. The fall in successive counts was steeper, and the level of the later counts lower, with soap containing this compound than with ordinary soap. Much more remarkable was the effect when normal subjects used this soap for all purposes for a week. A test by Price's method then gave very low counts throughout, apparently indicating that even the resident flora of the skin had been largely suppressed. It is suggested that surgeons using this soap constantly can justifiably shorten the process of pre-operative scrubbing up, and dispense with the use of irritating germicides. Direct evidence in support of this was obtained by comparing bacterial counts from hands of persons not using the soap who applied spirit and tincture of iodine after scrubbing up and subsequently wore rubber gloves for 45 minutes, with those of habitual users of the soap who followed the same proceeding, but omitted the application of spirit and tincture of iodine. Clinical experience and the negative results of repeated patch tests indicate that this soap is non-irritating to the skin.

ANON. (1944.) Laboratory and field studies of glycols and floor-olling in the control of air-borne bacteria.—*U.S. Nav. med. Bull.* 42. 1288-1308. [Abst. in *Bull. Hyg., Lond.* 20. 38, copied *verbatim*. Signed: A. J. H. TOMLINSON.] 973

The authors observed that the introduction of a glycol into air produced a rise in the dewpoint. With propylene glycol, two dewpoints were observed: at the first, a very thin layer of condensate appeared, probably consisting mostly of glycol; as the temperature was reduced, the second dewpoint was observed, with a much heavier condensate. The first of the dewpoints was much less obvious when triethylene glycol was used. The dewpoint of air-glycol mixtures depends on the concentration of glycol and on the initial dewpoint of the air, and it is suggested that it might be possible to calculate glycol concentrations from a knowledge of these dewpoints. On theoretical grounds, it was shown that with a concentration of propylene glycol in air of 0.2 mgm. per litre, temperature 20 C., and relative humidity 50 per cent., the initial condensate would contain 42 per cent. propylene glycol. The disinfectant action of propylene glycol on artificially infected air may be due to a direct lethal effect of this condensate. Propylene glycol vapour (the concentration of which can be estimated chemically) has been used as a tracer substance to measure air turnovers.

Observations have been made on the distribution of glycol concentrations in a room of 3,700 cubic feet unobstructed volume. With an output of propylene glycol calculated to maintain a constant air concentration of 0.14 mgm. per litre, concentrations of glycol within the room were found to vary from 0.25-0.13 mgm. per litre.

An attempt was made to reduce the bacterial content of the air of a ward 36 x 24 x 10 feet, containing, on an average, 12 patients. A slit sampler was used to determine the number of bacteria per cubic foot of air. Preliminary trials demonstrated the expected rises in the bacterial content of the air following sweeping, bed making or any other disturbance in the ward. No reduction of these peaks, or of the bacterial content of the air of the quiet ward, was observed when using either propylene glycol or triethylene glycol. Later

experiments were carried out, with the same result, in which the glycol concentration was raised so as to produce fogging.

Oiling the floor was considered completely effective if the bacterial content of the air, after sweeping, did not differ from that of the quiet ward. A single application of oil was completely effective for a week, and

See also absts. 846 (disinfection in E.I.A.), 847 (acaprin in piroplasmosis), 849, 1006 (anthelmintics), 1006 (blowfly dressings, tick dips), 881 (treatment of equine colic), 888 (of laminitis), 896 (of otitis externa), 943 (sulphonamides and penicillin), 987, 988 (penicillin).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

PATERSON, A. B. (1945.) The diagnostic value of Rothera's test on milk.—*Vet. J.* 101, 199-204. 974

The value of the Rothera test for the detection of acetone and acetoacetic acid in milk was examined with a view to its use in the diagnosis of ketosis in the dairy cow. The test was carried out by pipetting 10 ml. of milk on to 5 g. of powdered $(\text{NH}_4)_2\text{SO}_4$, shaking to ensure solution and adding 0.1 ml. of a freshly-prepared 5% sodium nitroprusside solution followed by 2 ml. of concentrated ammonia solution. The intensity of the resulting pink to purple colour was ascertained after 5 min. and classified as +, ++, +++ or ++++.

Of the total acetone bodies β -hydroxybutyric acid gives no reaction even in tolerably high concentrations. A faint positive (+) reaction was obtained with a concentration of acetone equivalent to 5 mg. % and about 1.5 mg. % of acetoacetic acid; an intensely positive (++++) reaction was given by 20 mg. % acetone and 3.5 mg. % acetoacetic acid. The test for acetoacetic acid was less sensitive in soured milk, probably because of its conversion into acetone, but the sensitivity of the test for acetone was not impaired on souring.

Large amounts of formalin (10%) interfered with the reaction but the sulphonamides, linseed oil, strychnine, turpentine, iodine, camphor and sodium salicylate gave no colour with the test. In normal milk the average percentage of β -hydroxybutyric acid was about 30% of the total acetone bodies, compared with 70% in blood. The Rothera test was negative with the milk of normal dairy cows and also in the milk of cows suspected to be suffering from ketosis but with normal amounts of acetone bodies in the blood. In cows showing definite clinical symptoms of the disease the test was positive and this was confirmed by quantitative estimation of the total acetone bodies present in the milk. The use of the test as an aid to diagnosis may be summed up as follows: a negative reaction denotes absence of ketosis; a faintly positive test denotes some degree of acetonæmia and diagnosis of ketosis must be confirmed by purely clinical observations; a strongly positive test denotes pronounced acetonæmia, although the severity of clinical symptoms may vary considerably and may not be directly proportional to the intensity of the reaction. Owing to the concentration of blood acetone bodies by the kidneys, even in the normal cow, the use of Rothera's test on urine is of doubtful value as an aid to diagnosis.—A. EDEN.

CAULFIELD, W. J., & MARTIN, W. H. (1945.) Determination of improper pasteurization by applying the New York City field phosphatase test to Cheddar cheese.—*J. Dairy Sci.* 28, 155-160. 975

As Cheddar cheese is now often marketed after a limited ripening period, a quick, accurate test is needed for detecting samples made from improperly pasteurized milk. It was found that freshly made Cheddar cheese and whey gave a phosphatase reaction similar to the milk from which they were produced and that the addition of only 0.25% of raw milk to the pasteurized

partially effective for another week. A second application was completely effective for two weeks.

The authors suggest that the majority of hospital infections depend on the resuspension of infective particles in the air. Measures to eliminate this resuspension, e.g., oiling the floors, should eliminate much cross infection in hospitals.

would give a positive phosphatase test. During storage it was found that some samples which were originally positive gave negative reactions, particularly after the third month; this was due to a lowering of the pH of the mixture. The percentage of false results was reduced by mixing the cheese with buffered water before adding it to the buffered substrate. During a six-month ripening period no samples with initial negative phosphatase reactions became positive, but after six months storage the phosphatase activity diminished. Control tests showed that there were no interfering materials in Cheddar cheese which might give rise to false positive tests.—J. O. L. KING.

— (1945.) Outbreaks of disease in the United States during 1943, transmitted by water, milk and milk products, and other foods.—*Publ. Hlth Rep., Wash.* 60, 491-492. 976

Gastro-enteritis and typhoid were the principal water-borne diseases encountered, of which there were 26 outbreaks involving 5,612 persons of whom 15 died. The chief causes were lack of or improper chlorination, inadequate protection of water supplies from surface drainage and seepage from sewage. Forty outbreaks of diphtheria, food poisoning, gastro-enteritis, scarlet fever and typhoid fever affecting 1,590 persons and causing seven deaths were started by milk or milk products. The most important causes were lack of, or improper, pasteurization, improper cleansing of utensils, bulk milk contamination and carriers. Foods other than milk were responsible for 285 outbreaks with 13,938 cases and 33 deaths.—J. O. L. KING.

GRIFFIN, A. E., & CHAMBERLIN, N. S. (1945.) Bacteriological improvements obtained by the practice of break-point chlorination.—*Amer. J. publ. Hlth.* 35, 199-210. 977

Chlorination proved the most efficient method of water purification but occasionally paracolon or late lactose-fermenting organisms were not destroyed. As it was found that free available chlorine killed bacteria within a very few seconds and spores within 2 min., while chloramines of the same magnitude required up to 90 min., experiments were carried out using break-point chlorination, a controlled superchlorination process which produces and maintains free available chlorine residuals. The results obtained in four cases are analysed.

In the first, water was obtained from a reservoir into which a small amount of domestic waste was discharged. In a two and a half year period during which chloramination was in use, 9.4% of samples planted in broth tubes showed gas formation; when break-point chlorination was introduced not a single sample produced gas in two and a half years. During chloramination the chlorine applied averaged 2.49 p.p.m. and the chlorine residual was as high as 1.00 p.p.m. With break-point chlorination the chlorine applied averaged 3.67 p.p.m. and the chlorine residual 0.75 p.p.m. The other three cases confirmed these findings, showing that

it is possible to eradicate all late gas-forming bacteria from water without impairing its taste and odour.

—J. O. L. KING.

BONGERT, J. G. (1944.) Die wirtschaftliche und sanitätspolizeiliche Beurteilung der Knochentuberkulose. [The economic and hygienic aspects of meat inspection judgement on bone TB.]—*Arch. wiss. prakt. Tierheilk.* 79. 148-155. 978

B. discusses past and present German meat inspection regulations in relation to the disposal of carcasses in which there is TB, of a bone or bones. At present a single TB. lesion condemns the whole skeleton, but B. argues that this is unnecessary and recommends the X-ray examination of the vertebrae and long bones of carcasses in which the disease is suspected: he himself has usually found such lesions to be single and isolated, in which case the whole skeletal tissue with its valuable fat content need not be condemned. This applies to cattle and swine.—J. E.

POUNDEN, W. D., FERGUSON, L. C., & SUNDERVILLE, E. J. (1945.) Methylene blue food utensil test.—*N. Amer. Vet.* 26. 271-273. 979

The methylene-blue test (as used in Great Britain for the detection of bacterial contamination in milk) was adopted as a means of checking the efficiency of the methods used in the cleansing and disinfection of food utensils in public eating establishments.

Methylene-blue (1:150,000) was added to partially skimmed milk which was boiled for 30 min. and then cooled. (The colour is lost on boiling but returns after cooling.) The coloured milk was used to rinse out utensils and then incubated at 37°C. for 15 hours.

Samples not decolorized at the end of the test indicate a satisfactory standard of cleanliness. Those only partly decolorized are considered to indicate moderate efficiency, whilst complete decolorization, with or without gas formation, indicates inefficient methods of cleansing.—H. E. BYWATER.

— (1945.) The work of the Army Veterinary Services in relation to military dairy farms in India.—*J. R. Army vet. Cps.* 17. 10-16. 980

During the war, the Military Dairy Farms Department expanded rapidly to meet the greatly increased demand for milk and other dairy products. The stock on the farms consists largely of buffaloes which far outnumber ordinary cows (45,000 buffaloes to 5,000 cows); some of the farms house up to 3,000 animals. Buffalo milk averages 7-8% butter fat and is mixed with separated milk to reduce the fat content to 3.7% and render the milk more digestible to Europeans; all milk is pasteurized before use. Butter, cream, evaporated milk and cheese are also produced. In earlier years these dairies were stocked with cows of indigenous breeds crossed with European dairy bulls, mainly Ayrshire. At present Friesian bulls are used. Grades up to fifteen-sixteenths have been produced. Experience indicates that the five-eighths cross is the most satisfactory. Pure-bred herds of Indian milch breeds have been developed whose average is better than that of pure-bred or cross-bred European cattle. This great stock of dairy animals has provided material for the study of disease problems, especially those which affect buffaloes. The results of this study are summarized.

Pericarditis (traumatic) was a frequent cause of death in buffaloes; the symptoms differed from those seen in cattle, in that the early stages were not so clear, the typical "grunt" of cattle was not heard and the oedema in the later stages occurred less frequently. Mastitis seemed to be chiefly associated with injury to the long pendulous teats. Chronic mastitis due to *Streptococcus agalactiae* has been investigated only on

a limited scale. "Panting" occurs in the hot weather in high-grade European cows; the symptoms are distressed breathing, high temperature, poor condition, hide-bound coat and poor milk yield. Such cattle are sent to farms in cool climates and are not used for breeding. Prolapse of the uterus is of frequent occurrence in buffaloes following manual manipulation at calving. Epidural anaesthesia has proved useful in controlling the excessive straining. Retention of the placenta with subsequent metritis occurs frequently in buffaloes. The incidence of this condition, also the incidence of mortality in calves from septicaemia due to *Salmonella dublin*, decreased greatly when calves were allowed to suckle for four days after birth. Treatment of metritis in the buffalo is influenced by anatomical considerations. The vagina is short and curves upwards and then slightly downwards, the cervix is small and situated on the floor of the vagina and protrudes very little into the vagina. These factors make the introduction of a uterine catheter very difficult. These anatomical features also make artificial insemination difficult. It has not been possible to use the artificial vagina for collection of semen because of the marked sexual excitement and intractability of both male and female buffaloes at the time of service.

All newly purchased animals as well as those bred on the farms are inoculated against rinderpest with goat virus. Calves under six months of age, pregnant cows within a month of calving and those considered physically unfit are not inoculated. Serum is given simultaneously with the goat virus to all adult buffaloes, as they are liable to severe reactions. Purchased European stock or stock with over 50% of European blood also receive serum. Other classes of animals do not receive serum "except for the control of severe reactions". All cattle of European breeds are vaccinated against anthrax at six months of age and in addition, all adult cattle intended for field service areas are vaccinated ten days before issue with saponin glycerinated spore vaccine given subcutaneously. Foot and mouth disease is of frequent occurrence and it is almost impossible for an animal to escape infection. Buffaloes and cattle of Indian breeds are resistant. In imported cattle such as Friesians the disease is severe and mortality may be considerable. Outbreaks are common of variola vaccinia and cause considerable loss of milk. A policy of vaccination of all newly purchased stock has been adopted. Ordinary calf lymph as used for human vaccination is employed, the site of vaccination being the internal surface of the ear. Outbreaks of haemorrhagic septicaemia occur in the rainy season and are dealt with by vaccinating all contacts as soon as a case occurs. On some farms where outbreaks are likely to occur, vaccination is performed at six-monthly intervals. Bovine contagious abortion occurs in most of the farms but has not caused great loss. Both strain 19 and strain 45/20 vaccines are being prepared but the work is as yet only in the experimental stages. Abortions clinically resembling those due to *Trichomonas foetus* have been seen but the presence of the organism has not so far been demonstrated. Johne's disease and TB. are both rare.—M. C.

TODD, W. C. (1944.) The army veterinary service for the army air forces at Mitchen Field, N.Y.—*J. Amer. vet. med. Ass.* 105. 385-390. 981

Veterinary service carried out included the inspection of meat, meat food and dairy products, the sanitary control and medical care of army sentry dogs and treatment of small animal pets of army personnel and the sanitary control and medical care of the animals at the farm of the Army Air Force Convalescent Centre, Pawling, New York. Large quantities of food are stored

in cold storage and these are inspected on receipt and prior to issue. Small laboratory animals are also bred for the hospital laboratory. The 27 photographs repro-

duced show the excellent accommodation provided for the Army Veterinary Service and the scope of its work.

—J. A. GRIFFITHS.

See also absts. 778 (human glanders), 811 (zoophrophylaxis of malaria), 814 (sarcosporidiosis in Danish slaughter animals), 880, 1009 (trichinosis

TECHNIQUE AND APPARATUS

DEVIGNAT, R. (1944.) A micro-glucide dish.—*J. Bact.* 48. 491-494. 982

This apparatus consists of a 14 cm. by 5 cm. petri dish, containing a cardboard or metal frame, divided into two sets of ten compartments. Each compartment contains a small glass tube, into which is placed a different carbohydrate solution. The tubes are inoculated with the organism under study and the results are read after incubation, against a white background. [There is no provision made for the detection of gas production.]—I. W. BROCKLEHURST.

KALNITSKY, G., UTTER, M. F., & WERKMAN, C. H. (1945.) Active enzyme preparations from bacteria.—*J. Bact.* 49. 595-602. 983

An apparatus for grinding bacteria is described. A paste of organisms and powdered glass is passed between concentric cones of glass. The inner cone contains ice to cool the grinding surface and is rotated by a motor. The ground paste is extracted with a buffer solution and glass, intact cells and cell debris are removed by centrifugation.—E. BOYLAND.

THEMANN, (1944.) Ueber einen einfachen und schnellen Nachweis von Fränkelschen Gasbrandbazillen (*Bac. perfringens*) mit Hilfe einer Nährbodenreaktion. [A simple and rapid identification of *Cl. welchii* by means of a cultural reaction.]—*Dtsch. med. Wschr.* 70. 182-183. [Abst. in *Bull. Hyg., Lond.* 20. 49, copied verbatim. Signed: G. PAYLING WRIGHT.] 984

A culture medium which is prepared as follows is helpful for the early identification of *Cl. welchii*. Ten cc. of sterile 8 per cent. FeCl_3 are mixed with 100 cc. of cold sterile 20 per cent. Na_2SO_4 . To this mixture are added 100 cc. of sterile human serum and 790 cc. of sterilized gelatin (gelatin 1·80 gm., NaCl 3 gm., Na_2HPO_4 2 gm., peptone 10 gm., water to make 1,000 cc.). The gelatin should be of about pH 7·3 so that the final solution should be of pH 7·0 or, at most 7·1. The final medium should be clear, or not more than slightly turbid, and should be tubed in 10 cc. amounts. It remains stable for months.

Cl. welchii causes a blackening of this medium: with large inocula the discolouration is diffuse, but with small ones, black dots, varying in size from a pin's point to a pin's head, can be seen to develop in different parts of the tube. The average interval between inoculation and blackening with strains of *Cl. welchii* which had been recovered from eight cases of gas gangrene, was less than five hours; the longest interval recorded was 11 hours.

Tests for the blackening of this medium were made with the following organisms: *B. mycoides*, *B. subtilis*, *B. vulgatus*, *B. mesentericus*, *Bact. coli*, *Proteus*, *Chr. prodigiosum*, enterococci, staphylococci, streptococci, sarcina, the organisms of the colityphoid and dysentery groups, *C. diphtheriae*, *Cl. oedematiens*, *Cl. septicum*, *Cl. sporogenes* and *Cl. welchii*; all except *Cl. welchii* gave negative results.

STOLZ, A. (1944.) Rinder-Fruchtwasser als Grundlage für Trichomonaden- und Bakterien-Nährböden. [Bovine amniotic fluid as base of trichomonad and bacterial culture media.]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 52/50. 84-85. 985

S. found that undiluted amniotic fluid of cows in the first three months of pregnancy was an excellent medium for the growth of cattle trichomonads, strong active growths being observed after 12-24 hours at 37°C. The pH of the freshly drawn fluid ranges around the neutral point: the normal pH is most favourable for culture but it rises slightly during the growth of the trichomonads and they then become less active; the addition of a little acid will, however, restore their activity. A pH value below 6·8 is entirely unfavourable for cultivation.

Amniotic fluid compares favourably with meat broth for the preparation of liquid media and can be used in the preparation of solid media for bacterial culture. The addition of peptone, salt and sodium sulphate and the adjustment of the pH to 7·4 increased the growth of most bacteria.—C. HORTON SMITH.

PACKCHANIAN, A. (1944.) An apparatus to facilitate the feeding of insects on laboratory animals.—*Amer. J. trop. Med.* 24. 273-275. 986

Photographs, a scale drawing and a description are given of a table on which a host animal can be securely and comfortably held for a period of several hours. Overhead is a frame which holds the culture of feeding insects.—G. B. S. HEATH.

FLEMING, A. (1945.) Micro-methods of estimating penicillin in blood serum and other body fluids.—*Amer. J. clin. Path.* 15. 1-6. 987

The bacteriostatic action of blood or other fluids containing penicillin is measured by determination of the dilution which will prevent haemolysis on incubation with haemolytic streptococci. The observations with serial dilutions are made either in slide cells made from microscope slides and vaselined paper or in lengths of capillary tubing held in plasticine.—E. BOYLAND.

HEILMAN, D. H., & HERRELL, W. E. (1945.) The use of Fleming's modification of the Wright slide cell technic for determining penicillin in body fluids.—*Amer. J. clin. Path.* 15. 7-9. 988

Details of the slide cell technique for estimation of penicillin are given with illustrations. Standard solutions of penicillin can be kept in the frozen state in solid carbon dioxide for several months. Cultures of *Streptococcus pyogenes* used as test organism can also be preserved in solid carbon dioxide.

It is not necessary to maintain absolute sterility as most ordinary contaminants do not grow in the medium employed.—E. BOYLAND.

JUPE, J. H. (1945.) The electron microscope.—*Brit. med. J.* Oct. 13th. 500. 989

The principle applied in the electron microscope is that an electron stream, accelerated to high speeds by very high voltages, takes on the characters of any thin object placed in its path and produces a shadow image on a fluorescent screen. The latest form of the apparatus consists of a stainless steel column at the top of which is the hot cathode tube producing the electron stream and at the bottom of which is the viewing chamber. An oil diffusion pump creates the necessary vacuum in the microscope and air-locks are provided, so that specimens and photographic plates may be inserted without destroying the vacuum in the whole tube. The mag-

nification may be varied in 40 steps from 100 to 20,000 times and by photographic means a final magnification of 100,000 diameters may be obtained. Theoretically a magnification of 200,000,000 diameters can be attained, but in practice it is not likely that the maximum resolving power will ever be achieved. Specimens for examination are mounted on a thin film of nitrocellulose. The technique is not difficult and by its use viruses have already been observed for the first time.—T. E. G.

BYROM, F. B. (1944.) A pressure-operated safety circuit for use in high-vacuum serum-drying plants. —*J. Hyg., Camb.* 43. 349-351. 990

A simple form of Pirani gauge has been devised for use with a high-vacuum serum-drying cylinder of the Greaves-Adair type. In conjunction with a recording galvanometer it gives a continuous record of the total residual pressure and if the pressure rises to a dangerous level, an electromagnetic relay incorporated in the circuit breaks the electric current heating the frozen serum, thus delaying materially the onset of fusion of the serum.—H. SCOTT McTAGGART.

TAN, V. N. (1945.) Quelques considérations sur le diagnostic de la gestation par la méthode de Cuboni. [Pregnancy diagnosis by Cuboni's method.]—*Rec. Méd. vét.* 212. 238-245. 991

T. describes a slight modification in the technique of the Cuboni test for pregnancy in mares, which, he states, facilitates the final reading of the test. This consists in the repeated washing of the benzene extract with 10% solutions of sodium carbonate and of caustic soda until the extract is perfectly clear, the object being to get rid of undesirable phenolic substances which may be present. This procedure has the disadvantage of imparting a very slight fluorescence to the final H_2SO_4 solution in the case of urine samples from non-pregnant mares; a deep, green fluorescence must therefore be present before a positive result (*i.e.*, confirmation of pregnancy) is given. T. regards the test as being reliable only from the 150th day of gestation onwards.

—N. J. SCORGIE.

EBRIGHT, R. E., HUNTER, F., & DONEY, C. (1945.) Operation of an animal blood bank.—*Vet. Student, Iowa*. 8. No. 1. 9-12. 992

The authors describe in detail a successful method for the collection, storage and transfusion of equine, bovine and canine blood. The choice of equipment, its sterilization, the selection and bleeding of donors, storage and transfusion of blood are described. Using the preservative and anticoagulant solution described by HEATHER *et al.* (1941) they were able to store equine and bovine blood for 121 days and canine blood for 40 days before excessive haemolysis occurred. No typing was necessary in the case of cattle and dogs but in the case of horses a simple compatibility test was required.

See also absts. 784 (cultivation of *Bact. coli*), 804 (tissue culture of avian plasmodia), 806 (inoculation of chick embryos by plasmodia-infected mosquitoes), 809 (preservation of avian plasmodia by freezing), 824 (preparation of influenza vaccines), 845 (preservation of E.I.A. virus), 1010 (statistics).

For this test 4 ml. of donor's blood is mixed with 6 ml. buffered diluting fluid. To this one drop of recipient's blood-buffer mixture is added. If the bloods are incompatible agglutination of red cells occurs within 10 min.—R. M. ARNOLD.

UHLERIN, A., CLAGETT, O. T., OSTERBERG, A. E., & BENNETT, W. A. (1945.) Absorbable oxidized cellulose with thrombin as a hemostatic agent in surgical procedures.—*Surg. Gynec. Obstet.* 80. 470-472. [Abst. in *Bull. War. Med.* 6. 128, copied verbatim. Signed: J. F. CORSON.] 993

Absorbable oxidized cellulose is supplied in two forms:—(1) a transparent gauze-like material in 3-inch squares, and (2) a heavier material, like cotton wool, in short strips, $1\frac{1}{2}$ inches long and $\frac{1}{4}$ inch wide. It cannot be autoclaved but can be boiled for 3 minutes or may be kept in 70 per cent alcohol. Concentrated dried thrombin is supplied in ampoules of 5,000 or 10,000 units; for use it should be dissolved in not more than 5 c.c. of sterile normal saline.

The cellulose is first dipped in a 1 per cent. solution of sodium bicarbonate containing 1:5,000 "phemerol" (para-tertiary-octyl-phenoxy-ethoxy-dimethyl-benzyl-ammonium chloride monohydrate) to neutralize the slightly acid reaction of the oxidized cellulose, which would otherwise inactivate the thrombin; the cellulose is then soaked in the thrombin solution.

The authors used it to control bleeding in 60 cases.—22 general surgical, 20 neurological, 11 oto-laryngeal, 4 orthopaedic and 3 rectal cases. Excellent or satisfactory haemostasis was obtained in 57 (95 per cent). In the general surgical and the neurosurgical cases the cellulose was not removed before closure of the incision, irrespective of the provision of drainage; this caused no delay in healing. In oto-laryngeal cases it could be removed by suction after 5 days and was found to be more satisfactory for packing than ordinary gauze.

Tests of the disintegration of the material in various solutions were made; in blood or blood serum disintegration was advanced by the 4th day and complete by the 7th day. No fibres remained in the tissue 4½ days after its introduction into the wound; reaction was limited to the presence of a few polymorphonuclear leucocytes.

MACDONALD, A. J., & KRISHNAN, T. S. (1944.) An egg-cooling cabinet.—*Indian J. vet. Sci.* 14. 26-33. 994

This is an inexpensive cabinet for storing eggs during the hot dry season, wherein air temperature is lowered by about 20°F. and relative humidity raised 30-40% by evaporation of water. Compared with eggs stored at room temperature, eggs stored in this cabinet remained edible longer and were of better quality as judged by candling, measurement, and weight.

—ZAFAR ALI.

MISCELLANEOUS

BUCHANAN, R. E. (1945.) Cooperation in animal husbandry research.—*J. Anim. Sci.* 4. 87-95. 995

B. disclaims any training or experience in the technical aspects of animal husbandry and approaches the subject from the administrative angle, giving a useful review of the part played by regional laboratories and the means by which co-operation in research has developed in the U.S.A. Annual expenditure on research by the state agricultural experiment stations

exceeds 500 million dollars; of this animal husbandry research accounts for about 100 million dollars.

In discussing future progress he stresses the possibility of reducing loss from disease by the development of disease-resistant breeds of poultry and pigs. The present position as regards prevention of transmission of disease from animals, particularly swine, to man is stated to be unsatisfactory. "There is," he says, "far too much of an attempt to ignore disease

implications on the part of our animal husbandry men and too much of professionalism on the part of our veterinary scientists, and both need to work with our public health agencies"; this probably applies as much to many other countries as it does to the U.S.A. —M. C.

BUTLER, W. J. (1945.) Uniform state regulations for imported livestock.—*Vet. Med.* 40. 274-275. 996

B. points out the variation in regulations governing the inter-state movements of livestock and urges a greater degree of uniformity, even though complete uniformity would not be possible on account of the widely differing conditions of livestock management in certain areas.

B. considers that many unnecessary regulations were passed because authorities lacked knowledge of health conditions in adjoining territories. He considers that a central bureau of livestock statistics is required, under the jurisdiction of the Bureau of Animal Industry. —M. C.

TOLLEY, H. R. (1944.) Milk cow numbers and herd replacements by 1950.—*Bull. int. Ass. Milk Dirs.* 36. 99-113. 997

Two forecasts are made, one based on an expanding economy and the other on a depressed economy. On the first basis, 126,000 million pounds of milk will be required in the U.S.A. in 1950, while on the second basis, 116,000 millions will be needed.

Over a period of years the rate of increase in milk cows has been about the same as the increase of human population, namely 1%. On an average each year, 19 cows in a hundred are culled and replaced by 20 heifers. If this rate of increase continues there should be about 27.5 million milk cows in 1950, which at the present rate of output per cow would supply the requirements resulting from an expanding economy.

The adequate supply of nutritional needs requires an increase in consumption in the low income groups and a production of 140,000 million pounds. This might be obtained without any great increase in the numbers of milch cows if the output per cow was raised.—M. C.

ANON. (1944.) O peregone skota. [Transportation of stock in area freed from German occupation.]—*Veterinariya, Moscow.* No. 2-3. pp. 6-7. 998

To replenish areas devastated by the Germans, the Soviet Government proposed to buy livestock, horses, cattle, sheep, goats and pigs on a large scale from the *kolkhozes*, or collective farm, and on a small scale from the individual *kolkhoznik* or member of a collective farm. A mass movement of stock was anticipated for 1944 and guidance was given as to the inspection and immunization of stock, care and feeding whilst in transit and the choice of routes of transport, etc. —E. CHERKESI.

MAHER, C. (1945.) The goat: friend or foe?—*E. Afr. agric. J.* 11. 115-121. 999

After observing that public opinion is tending to favour the goat, in contrast to the former attitude of absolute condemnation, M. examines the place of the goat in Kenya's agricultural economy, also summarizing the advantages and disadvantages of goats in other countries. The article will be of special value to Veterinary Officers in the Colonial Empire.

Summing up the situation in East Africa, he concludes that there is no objection to the goat as such. The evils caused by the goat are due to the primitive technique of African goat-keeping. In return for proper methods of husbandry, goats may be valuable assets to many African farmers but this is no argument in favour of goats in their present role in African life.—M. C.

ENDERS, R. K. (1945.) Training the polygamous male. —*Amer. Fur Breed.* 18. No. 4. 28, 30 & 32. 1000

Most observers agree that red foxes in the wild are usually monogamous and that the same tendency to pair is also evident in foxes on fur farms. It has, however, been possible by selection and by using suitable methods of managing the male to change this natural behaviour and to train the male for polygamous use; the vixen usually offers no great objection to polygamy.

The following is a summary of the author's recommendations for training the male to polygamy: the male should be selected from a known polygamous strain; he must never be caged overnight with a female after he has been separated from his litter-mates; for initiation to copulation an experienced vixen should be brought to his pen and left only an hour or two, or until mating has taken place; in the event of non-copulation, a further trial should be made with another vixen. Most males will become polygamous after a few trials.

E. cites the observations of experienced fox-breeders to indicate that vixens come in heat later in the season with the polygamous method than when the system of mated pairs is employed. This may be due partly to the greater general activity of two animals living together and partly to direct sexual stimulation. One of the drawbacks of the polygamous system is the lower percentage of pregnancies resulting from this method of mating. This is due, usually, to the failure of the attendant to recognize the proper time in the oestrous cycle for putting the animals together. —N. J. SCORGIE.

I. AUSTRALIA. (1943.) The Institute of Inspectors of Stock of New South Wales, Year Book 1943. pp. 67. Sydney: The Institute. 8vo. 1001

II. AUSTRALIA. (1944.) The Institute of Inspectors of Stock of New South Wales, Year Book 1944. pp. 84. Sydney: The Institute. 8vo. 1002

I. In addition to three papers abstracted separately [BELSCHNER, V. B. 16. 69; MADDEN, *Ibid.* 74; YEOMAN, *Ibid.* 89] the Year Book contains the following:—"Anthelmintics" by H. McL. GORDON, "The work of the stock medicines board" by M. HENRY, "Brucellosis of cattle" by R. O. C. KING, "The effect of fat hen [*Chenopodium album*] on young lambs in dry conditions" by F. J. MADDEN, "Weight of greasy fleece in the Australian merino" by H. B. CARTER, "Some comments on poultry disease" by T. G. HUNGERFORD, "The treatment of mastitis of cattle" by W. L. HINDMARSH, "Hypocalcaemia in sheep—recent investigations" by M. C. FRANKLIN, "The laboratory diagnosis of swine fever" by L. HART, and the "War Agricultural Committee Movement" by C. C. CRANE.

II. The Year Book contains the following:—"Irrigation farming" by M. HENRY, "Development in N.S.W. by irrigation from the River Murray" contributed by the water conservation and irrigation commission, "The control of blowfly strike" by E. A. FARLEIGH, "Infestation of sheep in Hay Pasture Protection Board District with worms of the genus *Nematodirus*" by K. S. F. BRAY, "Treatment of haemonchosis under outbreak conditions" by HUGH McL. GORDON, "Dermatitis affecting the lower legs of sheep" by D. A. GILL (a preliminary note dealing with a dermatitis caused by a new species of *Trombicula*), "Sheep feeding on cereal rations" by M. C. FRANKLIN, "Food-borne disease of bacterial origin" by D. F. STEWART, "The artificial insemination of cattle" by W. L. HINDMARSH, "Some field observations on mineral imbalance in cattle" by F. E. TREVITT, "The use of stilboestrol in anoestrous cattle" by J. C. BEARDWOOD, "Post-mortem

appearance in some swine septicaemias" by K. V. BYRNE, "Anthrax—a note on control" by R. P. MAYER, "The collection of blood from fowls for laboratory tests" by L. HART, "Diet and production" by GRAHAME EDGAR, "Pastures protection boards and post-war projects" by R. P. MAYER, "Land settlement" by T. R. JONES, "Technical improvement in equipment for the field" by E. A. LUCAS, "Some questions submitted to the Research Station, Glenfield" and "A note on 'goitre' in lambs" by D. J. WALKER.

—H. McL. GORDON.

NORBERT, P. (1945.) L'Ecole de Médecine Vétérinaire à l'Institut d'Oka. [The school of veterinary medicine at the Institute of Oka.]—*Rev. d'Oka*. 19. 143–148. 1003

The veterinary school at the Oka Institute was formed in 1928 when the school of comparative medicine of Montreal University was moved to Oka and associated with the Trappist college of agriculture. The growth of the school, which originally turned out six graduates annually but had an intake of 32 students in 1945, is sketched, stress being laid on the provision of suitable buildings, which has been possible under the Trappist control.

The advantages are emphasized of the association of a veterinary school with an institute of agriculture, particularly when over 80% of the veterinary graduates are destined for private practice, and reference is made to the service the teachers in agriculture have given to the veterinary section.—U. F. RICHARDSON.

HOFFERBER, O. (1944.) Das veterinärhygienische

Institut der Deutschen Karls-Universität in Prag. [The Veterinary Hygiene Institute of the German Karls University at Prague.]—*Berl. Münch. tierärztl. Wschr.* [Wien. tierärztl. Mschr. February 18th. 66–67. 1004

In 1795 a professional chair in Animal Medicine was founded in Prague at the oldest German university. The chair continued until the death of Professor Dexler in 1931, when the establishment was closed by the Czech government.

After the annexation of Bohemia and Moravia during the war, steps were taken to revive the Prague institution and during 1942 premises were secured and equipped as a Veterinary Hygiene Institute, entrusted with research into the diseases of domestic animals in Bohemia and Moravia. H. appears to have been the director, assisted by a small technical staff.—J. E.

HARDEN, F. (1944.) Guide to the literature of veterinary medicine.—*Bull. med. Libr. Ass.* 32. 230–233. 1005

H. discusses briefly the general indexing and abstracting agencies for veterinary literature and the related sciences. [There are two inaccurate statements concerning *Index Veterinarius*. The notice concerning the dates of publication on the cover of each number has been misunderstood and there is a misstatement to the effect that the *Index* became defunct in 1942. The reason for the latter statement is not understood as copies of each issue have been regularly sent to subscribers in the United States and have been received by the libraries concerned.—ED.]—D. D. OGILVIE.

REPORTS

AUSTRALIA. (1942.) 16th annual report of the Council for Scientific and Industrial Research for the year ended 30th June, 1942. pp. 74. Canberra: Govt. Printer. fcp. 3s. 3d. Items of veterinary interest pp. 16–18, 21–25, 51–52, 57–58 and 60–62. 1006

Diseases studied included the following:—BOVINE MASTITIS, PLEURO-PNEUMONIA of cattle, MYXOMATOSIS of rabbits, ENTEROTOXAEMIA of sheep, TOXAEMIC JAUNDICE of sheep, "PEG-LEG" of cattle and URINARY CALCULI in sheep.

The louse (*Bovicola ovis*) was reared off the sheep host. It appears to subsist chiefly on waxy material adhering to wool fibres. At 38°C. the life-cycle was completed in 40–55 days. Owing to war-time needs the tar-oil fraction originally recommended for the sheep blowfly dressing B.T.B. 15 [see *V. B.* 12. 613] is no longer available. It may be replaced by a mixture of equal parts of kerosene and certain creosotes or middle oils. However, contact toxicity of the modified dressing is not high. Fractionation of Ceylon citronella oil showed that three fractions were ineffective as a repellent and that a fourth consisting of geraniol and citronella (7:3) was as effective as the whole oil. Pure oleic acid was repellent but the commercial acid was not. 10% camphor and Tagetes oil (Australian and South African) were not repellent. Of 25 sheep carcasses left exposed in the field only seven produced any adult *Lucilia cuprina*. These seven carcasses produced an average of 46 *L. cuprina* each. A further lot of ten carcasses was exposed with precautions designed to minimize the effects of parasites and predators. Nine carcasses produced *L. cuprina* and averaged 335 flies of this species per carcass. A small strike on a sheep can produce 400 or more *L. cuprina* and a large strike 4,000. Trapping in coastal areas where there are no sheep indicated that the population of *L. cuprina* is probably one-fifteenth to

one-twentieth as great as would be expected if sheep were present. The population density of *L. cuprina* was estimated in an area of 50 sq. miles near Canberra on four occasions during the 1941–42 blowfly season. Estimates were made by liberating stained flies at the centre of a 4-mile circle and calculating the ratio of stained to unstained flies taken in traps. Densities ranged from 0.4 to 2.5 adult *L. cuprina* per acre. Significant differences were established between populations of different areas within the circle. With freshly baited traps spaced at $\frac{1}{2}$ -mile intervals (1 trap per 300 acres) 1–4% of the *L. cuprina* population was trapped per day. Combination of Mules operation with docking of the tail to 4 in. gave marked protection against fly strike. According to conditions of temperature and humidity the non-parasitic period of the life-cycle of the cattle tick may last 18–359 days. On the host, under natural conditions, the larval stage lasted 5–10 days, the nymph 7–11 days, and the adult 6–14 days. Certain ticks, not necessarily in the moult, appear to be particularly resistant to arsenical dips. Dips containing 0.4% sulphuric acid as well as sodium arsenite were more effective than dips without the acid. A preliminary survey showed that infestation with the itch mite (*Psorergates ovis*) occurred occasionally, mainly in the cooler areas of southern Australia. Under experimental conditions, transmission was fairly rapid when newly shorn sheep were used as contacts. Of a number of common dipping agents tested, calcium polysulphide at 0.4% concentration was most effective. CHORIOPTIC MANGE is recorded in sheep in Australia for the first time. Affected animals showed lesions on feet and scrotum.

It was found that while a dose of 20 g. phenothiazine was sufficient for treatment of an adult sheep against *Oesophagostomum columbianum*, a higher dose

rate was necessary for treatment against *Trichostrongylus* spp. War-time conditions resulted in supplies being short of nicotine, carbon tetrachloride and phenothiazine. Copper sulphate, sodium arsenite and copper sulphate, arsenic pentoxide mixtures were found to be very effective against *Haemonchus contortus* and could replace copper sulphate, nicotine sulphate mixture or carbon tetrachloride for treatment against this parasite. Tetrachlorethylene, though also in short supply, can replace nicotine sulphate for treatment against *Trichostrongylus* spp. provided it is given after the oesophageal groove has been stimulated to close by a dose of copper sulphate. Preliminary studies showed a steady decline in wool production in young sheep artificially infected with *Trichostrongylus* spp. The decline continued for some time after the parasites had been expelled.

Physically disrupted bacilli were found to stimulate immune body production in animals experimentally infected with CASEOUS LYMPHADENITIS.

It is thought INFECTIOUS OPHTHALMIA (PINK EYE) of sheep is probably transmitted by flies under natural conditions, but all treatments tried were ineffective. The incidence of BALANITIS (PIZZLE ROT) of sheep was highest where the content of the pastures in clovers and similar legumes was high. Some promise of control was obtained by placing sheep on a restricted diet for a few weeks.

In studies on HYPICALCAEMIA and PREGNANCY TOXAEMIA of sheep it was found that complete starvation for a few days reduced the serum calcium in both pregnant and non-pregnant ewes. Continuation of the starvation period resulted in serum Ca values returning to pre-starvation levels. Some of the experimental sheep showed symptoms of hypocalcaemia. Starvation also resulted in the production of fatty livers and in an increase in blood ketone bodies and a fall in blood sugar. Ewes with depleted reserves of Cu and which had previously produced ataxic lambs, recovered and produced normal lambs when transferred to copper-dressed pastures. Field trials have shown that "straight steely" wool is definitely connected with a marked degree of Cu deficiency. Agrostological studies in relation to "trace" element deficiencies have been continued. The daily administration of small amounts of a salt of molybdenum during two and a half years has not produced BOVINE HAEMATURIA in experimental cattle. Studies also made carried out on energy metabolism, drought feeding, including Vitamin A and inorganic nitrogen, plant proteins and the absorption of Cu from the alimentary tract.

At the end of the second year of a trial of the influence of nutrition on wool production, the following figures were obtained. On a high plane of nutrition strong-woolled sheep bore 18.4 lb. of wool with a mean fibre diameter of 28μ , while similar sheep on a low plane of nutrition bore 8 lb. of wool with a mean fibre diameter of 21.5μ . The corresponding figures for fine woolled sheep were 13.3 lb. and 20μ and 7.3 lb. and 17.9μ . Results of studies on fleece "density" suggest that follicle group size rather than the number of groups per unit area is the dominant factor governing the population density of follicles in the skin. Studies were made on the general histology of the follicle group. Observations on the inheritance of skin wrinkles in sheep are continuing but it appears that the absence of skin folds is a dominant factor. An inbred flock of merino sheep is being prepared for several purposes. A shortened lower jaw was found to be a recessive condition. The studies on deglutition in sheep [see V. B. 12. 239 & 352] were concluded. The functional activity of the oesophageal groove reflex appears to be a feature of the pattern of behaviour which surrounds

the act of sucking the ewe but not part of the pattern associated with the act of consuming liquid in order to quench thirst. The influence of copper salts was not altered in sheep which had been weakened by poor nutrition. Experimental zebu herds now number 7,794 head, of which 6,306 are quarter-breeds. Cross-bred cattle reach chilling weights approximately one year earlier than British breeds. Of 235 cross-bred bullocks slaughtered 88% were graded first quality.

—H. McL. GORDON.

GOLD COAST COLONY. (1944.) Report on the Department of Animal Health for the year 1943-44. [STEWART, J. L.] pp. 5. Accra: Govt. Printing Dep. (Publications Branch): London: Crown Agents for the Colonies. fcp. 1s. 1007

The Department continued to suffer from war-time disability and was working with approximately half its normal staff, but essential disease control services were maintained and increased demands for livestock to fulfil military requirements were met.

Control of BOVINE CONTAGIOUS PLEURO-PNEUMONIA and RINDERPEST by prophylactics produced locally continued to give satisfactory results. Investigational and research work was perforce reduced to a minimum as the laboratory staff were fully occupied with normal routine, particularly in the preparation of large quantities of vaccine and antiserum against these diseases.

TRYPAENOSOMIASIS seemed to be more in evidence and a more virulent form than usual was encountered; field observation suggested that transmission by *Glossina submorsitans* caused this increased virulence which resisted normal routine treatment. Organized riverine clearing of tsetse bush continued to give good results.

Control of Army meat supplies was taken over by the Department, with the assistance of officers and N.C.O.'s seconded from the army. Major supplies were drawn direct from the French Sudan Veterinary Department. The experimental farms continued to supply improved breeding stock. The demand for good pigs was increasing and many private African pupils attended courses in practical livestock management. Large White and Large Black pigs were bred for distribution.—S. A. EVANS.

U.S.A. (Undated.) Annual report of the Los Angeles County Live Stock Department, Los Angeles, California, for the fiscal year ending June 30, 1944. pp. 40. Los Angeles, Calif.: County Live Stock Department. Items of veterinary interest pp. 2, 5-7, 9-18 & 23-29. 1008

Amongst the most frequently occurring diseases of dairy cattle the following are reported:—MASTITIS, PARATYPHOID in calves, COCCIDIOSIS, INFECTIOUS VAGINITIS, wire puncture of the reticulum, MECHANICAL PNEUMONIA (due to faulty drenching), non-specific HAEMOGLOBINURIA, CHEMICAL POISONING (due to grazing on roadsides where chemical weedkillers had been used). During the 1944 fiscal year, 48,050 cattle were imported into Los Angeles county; the number of reactors to the tuberculin test amongst these was 0.642%. In the county there were 102,714 head of dairy cattle and of these 39,234 were tuberculin-tested during the year, 119, i.e., 0.30% of the cattle tested, being reactors. Several deaths due to necrophorus infection of the intestines were recorded in range cattle. Heavy infestations of biting lice, *Bovicola bovis*, were found in pasture cattle suffering with an itchy rash.

ENCEPHALOMYELITIS in horses did not increase, as had been the case in the immediately preceding years. The department examined the brains of all horses dying in the county, so that vaccination with the Eastern type

vaccine could be used if the Eastern type virus were isolated. Lesions in the skin due to *Setaria equina* have been recorded in several horses. A list is given of the conditions observed in cattle, horses, goats and deer subjected to P.M. examination.

Salmonella infections in swine have been treated with sulphathalidine with promising results. SWINE ERYSIPELAS was not diagnosed during the year. A list is given of the conditions observed in 92 pigs which were submitted to P.M. examination during the year.

SWINE FEVER was more frequent than the average of the previous few years. Twenty-four outbreaks of VESICULAR EXANTHEMA in pigs were recorded during the year, most of the outbreaks being of low virulence.

In poultry the most frequently occurring diseases were PULLORUM DISEASE, COCCIDIOSIS, LYMPHOMATOSIS and FOWL CORYZA. PULLORUM DISEASE and PARATYPHOID were the two most frequently diagnosed conditions in turkeys. In a discussion on FOWL CORYZA

the importance of healthy carrier birds is stressed. In PNEUMO-ENCEPHALITIS a special chick embryo vaccine has been tried. Cases of the disease appeared on two of the ranches where the vaccine has been used, vaccinated and non-vaccinated birds being affected. Other diseases which are recorded as occurring in poultry during the year are TRICHOMONIASIS of the oesophagus, HEXAMITIASIS, and nematode and tapeworm infestations. Investigations on turkey diseases have been made co-operatively with the University of California. PARATYPHOID and HEXAMITIASIS have been studied.

A small-scale experiment on the effect of *Saccharomycopsis guttulatus* INFECTION in rabbits suggests that it will arrest normal growth and may be a contributory factor to MUCOID ENTERITIS, the most frequently observed condition in rabbits. FAVUS, COCCIDIOSIS and *Giardia* INFECTION were also seen. A list is given of the conditions found at P.M. examination of rabbits and other species of small animals.—T. E. GIBSON.

BOOK REVIEWS

GOULD, S. E. [M.D., D.Sc., Pathologist and Director of Laboratories, Eloise Hospital, Eloise, Michigan, Assistant Professor of Pathology, Wayne University College of Medicine, Detroit]. (1945.) *Trichinosis*. pp. ix+356. Springfield, Ill.: Charles C. Thomas. 8vo. \$5.00. 1009

Any book which recounts all that is worth knowing on a single disease can give much satisfaction to its owner, and anyone possessing this monograph on trichinosis can be confident about its value. It is not surprising that this book should emanate from the U.S.A. where the relatively high incidence of trichinosis amongst the adult population has, during the past decade, been revealed as the result of surveys of autopsies and anatomical material. The unsettled conditions in countries involved in the Second World War appear to have contributed to the spread of trichinosis since outbreaks have appeared in Canada, Britain, Norway and Syria, countries usually almost or completely free from the disease.

In this monograph, G. brings together information widely scattered throughout medical and veterinary scientific literature, on the parasite and on the more important aspects of the disease it causes. The book has 13 chapters, and in the first of which the history of the disease and its elucidation is well told, from the original discovery of the worm by James Paget in 1835, while a first-year medical student at St. Bartholomew's Hospital in London. Chapter 2 recounts the life-cycle of the parasite and Chapter 3 contains detailed descriptions of the morphology of the intestinal and muscle forms, while Chapter 4 deals with epidemiology of the disease. Of particular interest to veterinarians is Chapter 5 which discusses trichinosis in animals; the reader comes to realize that "*Trichinella spiralis* is perhaps the single species of parasitic nematodes least restricted in its range of hosts". The next chapter of 60 pages deals with the pathology of trichinosis and includes accounts of the changes produced in the gastrointestinal tract, skeletal muscles, heart, lungs, brain and meninges, and other organs. Immunology in trichinosis is the subject of Chapter 7 where the various immunological tests are discussed in detail. G. summarizes our knowledge of the immunological tests by pointing out that eosinophilia appears as early as the 10th day of

infection, the immediate type of intradermal reaction on or after the 17th day of infection, the precipitin reaction on or after the 28th day, and the complement-fixation reaction on or after the 25th day. Chapter 8 is devoted to accounts of the various laboratory diagnostic methods and is followed by a chapter on symptomatology. Chapter 10 discusses the diagnosis of the disease, with illustrative human cases. Treatment and prognosis occupy the two following chapters. The final chapter summarizes the very important subject of control measures. The book is profusely illustrated with excellent photographs and is furnished with an extensive bibliography, arranged chronologically from 1822 to 1943; there are adequate author and subject indexes. The monograph is concisely and agreeably written and will be found to be a complete guide to trichinosis.

—J. N. OLDHAM.

TIPPETT, L. H. C. [Statistician to the British Cotton Industry Research Association]. (1943.) (Reprinted 1944.) *Statistics*. pp. 184. 17 figs., 15 tables. London, New York & Toronto: Oxford University Press. 3s. 6d. 1010

This small well-written book will be much appreciated by those who wish to become acquainted with the uses of statistical method, its general principles and the methods of reasoning underlying it. It is an admirable introduction to the subject for it presents statistics without the rather cumbersome and, to some, formidable, mathematical symbolism which is present in most introductions to the subject. No detailed methods of calculation are given and the primary statistical concepts of errors, variation, probability and significance are dealt with in an efficient and readable way. Naturally, in a book designed to meet the demands of those interested in economic and sociological development, biological examples of statistical reasoning are few. Never-the-less, the wide range of application of statistics to every-day problems is evident from the fact that the quoted examples of such application range from the average income of sur-tax payers to the accidents to workers in a chocolate factory. There is little of direct veterinary interest in this book, but it will be useful to those who have an interest in statistical reasoning, general scientific method and the interpretation of field and laboratory data.—K. L. BLAXTER.

See also absts. 797 (outline of protozoology for medical and veterinary practitioners), 885 (diseases of animals in Moscow zoological park), 928 (artificial insemination and mating in horses), 1001, 1002 (Institute of Inspectors of Stock of New South Wales, Year Books, 1943 & 1944).

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